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No. VI. OF Vol. I., 1930. **No. 5554, Vol. CCXVIII.**

LONDON, SATURDAY, FEBRUARY 8, 1930

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ON THE

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ASSISTANT GYNÆCOLOGICAL SURGEON TO THE MIDDLESEX HOSPITAL; SURGEON TO CHELSEA HOSPITAL FOR WOMEN.

THE modern surgical treatment of carcinoma of the cervix dates from 1895 when Ries, of Chicago, suggested a method of radical extirpation by the abdominal route, the main feature of which was the dissection of the ureters from out the neighbourhood of the growth. This operation was actually carried out by W. W. Clark in 1896, and shortly afterwards Thring, of Sydney, devised a similar procedure. In 1898 Wertheim, of Vienna, began to perform an operation on the same lines as those suggested by Ries, but he improved it by placing clamps across the vagina, whereby the growth was cut off from the uninvolved vagina beneath it so that the risk of cancer infection was avoided. His operation was looked at askance by the gynæcological surgeons of that time and provoked much adverse criticism; but by rare courage and persistency he succeeded in forcing its value on a doubting surgical world, and it is by his name that this great advance will for ever be known.

The greatest feature of Wertheim's contribution to surgery was that it doubled the percentage of patients who could be operated on. Up to the time when his operation was accepted, patients with carcinoma of the cervix, if able to be operated on, were subjected to vaginal hysterectomy, and in not more than 25 out of every 100 presenting themselves was the growth early enough to permit of operation; whereas, by the new procedure 50 per cent. or more were able to be surgically treated, and further, the more than doubled operability rate was accompanied by a much increased five year survival rate.

The first British surgeon to perform it in Great Britain was Cuthbert Lockyer in July, 1905, shortly before which date he had assisted Wertheim himself to perform it at Plaistow Hospital.

My first Wertheim's operation was undertaken in the spring of 1907, since when I have performed it 382 times. Compared with operations on the stomach, gall-bladder, and so forth, series of which running into four figures have often been published, this may appear to be a small number, unless it is remembered that carcinoma of the cervix, though too prevalent, is not very common, forming only about 1·4 per cent. of the diseases peculiar to women: moreover, the clinical material from which large series of cases can be abstracted is far less abundantly supplied to the individual surgeon in this country than on the Continent, where the professorial system places an enormous amount of it at the sole disposal of the professor. My colleague, Comyns Berkeley, also carried out the first of his series in 1907, since when he has performed it between three and four hundred times, with results very similar to my own. Certain other British surgeons about that time also began to practise it, and from then till now it has been frequently performed in this country. It may be wondered, therefore, why it is that so few papers dealing with the results of long series have not been published here. There are two reasons. The first is that though many surgeons here have essayed it, comparatively few (for one reason or another) have done so on a large scale. The second is, that very few of those who have performed it in quantity have persisted in the labour of keeping in close touch with their patients over the long period of years necessary before the results of a series can be properly presented. The difficulty of keeping in touch with these patients, belonging as they mostly do to the poorer classes whose habitation is constantly changing, is very great. The Continental professor has at his command a number of assistants to whom he can delegate this work, whereas the British surgeon works more or less *solo*; and if he wishes to keep in touch with his patients he must do it for himself. Some sort of follow-up system is beginning to be organised at most large hospitals, but this is of quite recent date and still very imperfect.

RESULTS OF THE OPERATION.

Of the 382 Wertheim operations that I have carried out 284 were performed by the end of 1924, and this number therefore are available for examination on the basis of 5 years' freedom from recurrence. My results are as follows:—

Died of operation	47 (16·5 %)
Recurrence before 5 years	107
Lost sight of before 5 years	12
Died of other diseases before 5 years ..	8
Well at end of 5 years	110
	284

Operative Mortality.—The high operative mortality was the principal objection raised against Wertheim's innovation. He had 30 such deaths in his first 100 operations. Increasing experience and technical skill enabled him to bring the rate down to under 10 per cent. in his later cases. This has been, I think, the experience of all surgeons who have performed it largely. In my own case it has certainly been so, thus, I performed:—

	Per cent.
From 1907 to 1915, 110 operations with 22 operative deaths	20
„ 1916 to 1924, 174 „ „ 25 „ „	14·3
„ 1925 to 1929, 98 „ „ 8 „ „	8·1

Two questions are at once suggested. (1) To what are these deaths due? (2) What brings about their diminution?

The Causes of Operative Deaths.—The severity of the operation itself is less a factor in the death-rate than are the conditions general to the patient herself and local to the seat of the growth. A very considerable proportion of women suffering from cancer of the cervix are in very poor health, quite apart from the growth; in fact, I believe that very few develop cancer in that situation until their general condition from other causes has considerably deteriorated. The average age of these patients, moreover, is somewhere about fifty years. Of the 382 women I have operated on 14 were over sixty years, and 3 over seventy years. There were 23 patients under thirty-five years of age, 6 of whom were under thirty, but my general impression is that not much more than one or two of these young persons were in normal health—quite apart from their disease. The poor general quality of the clinical material with which the surgeon practising Wertheim's operation has to deal is paralleled in cases of cancer of the stomach and rectum; the surgeon in all three instances is handicapped from the start.

Nor is the local condition less important. The majority of cancers of the cervix are heavily infected by the time the patient seeks advice and some of them very intensely; so that the risk of post-operative infection of the operation area, even with the utmost precautions, is always present. How intense such infection may be is shown by the fact that Berkeley and I had amongst our early cases several examples of gas-gangrene of the abdominal wound exhibiting the typical black sphacelus of the muscles and foul effervescing pus, with which later on the war made all surgeons familiar.

Of the 382 patients on whom I have operated 55 died as the result of the operation, and the causes are as follows:—

Traumatic shock	20	Paretic obstruction	3
Hæmorrhagic shock	5	Peritonitis	2
Septic shock	13	Embolism	2
General sepsis	2	Suppression of urine	1
Pyelonephritis	3	Anæsthetic	1
Thrombosis of femoral artery	1		55
Secondary hæmorrhage	2		

The term "septic shock" describes that state of collapse which follows operative disturbance of an area already heavily infected and which is probably due to the manipulation suddenly launching into the circulatory fluids of the body a heavy dose of toxins or bacteria. It is most typically seen in cases in which the operative manipulations are too slight in themselves to cause shock, as, for instance, simple drainage of a big pelvic abscess. The symptoms differ from those of traumatic shock in that the patient is not pallid, but flushed and sweating, and the temperature is markedly raised. Death occurs within 48 hours as a rule. Including the deaths from general sepsis, peritonitis, and secondary hæmorrhage (which is always due to sepsis) it is seen that 19 of the deaths were due to infection, against 20 due to the sheer trauma of the operation.

Under the heading "hæmorrhagic shock" fall those cases who died as the result of bleeding during the operation. The loss of blood was not due to arterial or venous bleeding, but to a persistent oozing universal to the whole area operated on. These cases are fortunately rare, for the oozing cannot be stopped by forceps or ligature, and all that the surgeon can do is to get through the operation as quickly as possible, in which endeavour he is constantly being thwarted owing to his landmarks being obscured by blood.

Three deaths from pyelitis are less than might be expected, seeing the frequency with which infection of the urinary tract complicates convalescence. This frequency is partly due to the absolute paralysis of the bladder which always follows the operation, and which may endure for as long as two or three weeks, during all of which time catheterisation is necessary; but it is chiefly due to the bareing and displacement of the bladder whereby it backs into the free space left by the extirpation—a space which probably always becomes more or less infected.

Reasons for the Progressive Diminution in Operative Mortality.

My operative mortality has fallen from 20 per cent. in my first 100 operations to 8 per cent. in my last 98, and this fall has not been due to any change in my standard of selection. It is the result of a number of small improvements in the technique of the operation, each of which has been devised to shut the door against the repetition of some difficulty or disaster of the past—in short, it is due to utilised experience. I will therefore proceed to discuss in some detail those points in the technique of the operation by observance of which I have been able so markedly to lower my operative mortality.

Technique of Operation.

The Anæsthetic.—For an operation in which traumatic shock accounts for over 30 per cent. of the operative deaths, the advantage of spinal anæsthesia to block shock impulses is manifest, and I have employed it since 1910, combined with full ether anæsthesia. The reason for preferring ether to gas and oxygen is that it is a powerful stimulant, and tends to counteract the fall in blood pressure which spinal anæsthesia occasions—an important point, because so many of the patients are in poor general condition to start with. The utmost possible relaxation of the abdominal muscles is necessary in order that the surgeon can see what he is doing, and no one should undertake the operation unless he can count upon his anæsthetist to attain this safely. I have had the advantage of having as anæsthetist for the large majority of my cases Dr. Herbert Charles, whose unique experience with myself and Comyns Berkeley comprises nearly 700 of these operations.

Sterilisation and Packing of the Vagina.—The important step of sterilising the vagina is best effected by packing the canal with gauze soaked in violet green, the adoption of which for this purpose in 1916 was immediately followed by a remarkable lessening in post-operative sepsis. The vagina should be packed under the anæsthetic before the abdomen is opened, and it is essential to pack it tight right up to its vault, for unless the canal is made into a solid column, the separation of the bladder and rectum from it is rendered difficult and dangerous.

Protection of the Abdominal Wound.—It is probably impossible to absolutely sterilise a foul growth, and if any organisms are transplanted from it to the abdominal wound the latter will break down more or less seriously. To protect it, Berkeley and I, as a result of our unfortunate early experiences, soon began to wrap its edges with sheet rubber. I now use two layers of rubber, the first of which is attached to the skin by clips, whilst the second goes on with the retractor to which it is attached, and covers the whole thickness of the wound edges. An automatic retractor is a necessity in order that the operation area may be fully exposed and clearly seen, for many of the patients are very stout and the surgeon is working at a great depth surrounded by highly important structures, an accidental wound of which immediately deprives the patient of half of her chances.

On Separating the Bladder and Rectum.—The bladder and rectum should be separated by sense of touch; the former with the thumb kept pressed against the solid column formed by the packed vagina so that the flat of the thumb-nail rests against the bladder; and the latter by the first and second fingers, the pulps against the vaginal column, and the flat of the nails against the bowel. If the bladder is opened by accident, it should be sutured and the bladder should be drained, but a fistula may form. If the bladder is greatly thinned in the process of separation it may necrose later with the same result. I have had five vesical fistulas, of which two closed spontaneously. Accidental holeing of the rectum is a great disaster, for most of these cases die.

On Finding the Uterine Artery.—Fix forceps to the stumps of the cut round ligament and ovariopelvic ligament respectively, and get them pulled outward, meantime the uterus is pulled to the opposite side. With the fingers tease away the light cellular tissue in the upper part of the broad ligament until the external iliac vein is exposed. Work down the side of the pelvis, looking for the cord of the hypogastric artery which is running parallel to and inside the vein and about an inch below it. In easy cases the uterine artery can now be seen coming off it at right angles. If you cannot see it, feel for and expose the ureter as it runs on the posterior peritoneal surface of the broad ligament, and be sure that the artery is not running parallel to and just above it, as it sometimes does. If you still cannot see it, gently push the index finger down into the broad ligament just outside the ureter and see if you can hook forwards under the artery and lift it up. If this fails, as it may do when the tissues lateral to the cervix are indurated by growth or inflammation, work back along the hypogastric artery till you come to the internal iliac trunk and ligature that.

On Exposing and Isolating the Ureter.—Having divided the uterine artery close to its branching from the hypogastric artery, gently peel its distal end towards the uterus and the ureter will be exposed underneath it. If you have had to ligature the internal iliac, follow the ureter forwards from where it lies on the peritoneum to its junction with the bladder, cutting forwards with scissors in a line outside and parallel to it. You will presently divide the uterine artery; its proximal end will not bleed, though its distal may do. Pick up the distal end and peel it back to the ureter as before. It is necessary to

completely isolate the lower two inches of the ureter up to its junction with the bladder, for unless this is done the cardinal ligament which lies below it cannot be properly exposed or safely divided. More than two inches should not be isolated if it can be avoided, for fear of necrosis.

On Grafting the Ureter.—In advanced cases the ureter may be so embedded that it cannot be dissected, or may be nipped about half an inch from the bladder and dilated above the stricture. If the growth is not irremovable on other counts (as it often is) the best course, instead of wasting time in dissecting out the ureter, is to divide it above the point of embedding, and having completed the extirpation, graft it into the bladder. I have done this deliberately nine times, and once more on the single occasion when I accidentally cut the ureter, and in all ten of the operations the graft held. Ureteral fistulæ following the operation are due to necrosis of the duct by the combined effects of "isolation anæmia" and septic infection of the extirpation cavity. They develop in from five to ten days after the operation. I have had eight such, four of which closed spontaneously; two were treated by nephrectomy, one was successfully grafted into the bladder, and one remained open until the patient died of recurrence.

On Dividing the Cardinal Ligaments.—All the foregoing steps in the operation lead up to and are the necessary preliminary to what is in effect the essence of the operation—namely, the division of the cardinal ligaments. These ligaments consist of a couple of broad fan-like fibromuscular expansions which, rising one on each side from the lateral wall of the vagina, are attached to the side wall of the pelvis. Not only do they fix the vagina, so that until they are divided the mobilisation necessary before it can be cut sufficiently low down is impossible, but the main lines of growth infiltration and permeation run outwards in their upper part, so that the division needs to be made as near the pelvic side wall as possible. A surgeon who has never properly performed Wertheim's operation has never seen these ligaments for no other operation exposes them, so deeply hidden are they by the structures that overlie them. The ureters rest on their front and upper surfaces, whilst their back and lower surfaces are separated from the pararectal tissues and lateral rectal ligaments by fibro-fatty wads of tissue. It is unnecessary to clamp them before dividing them, as the few vessels they contain are small and can be picked up with forceps. Not until they are divided from top to bottom is the vagina really free. The division, except in the easiest of cases, has to be carried out largely by sense of touch, and it is this, I think, that makes Wertheim's operation, of all recognised surgical procedures, the most difficult to become expert in. During the division, which must be done with long bent scissors, the vagina and uterus should be strongly pulled to the opposite side, and the index finger should be hooked under the ligament both to hold it up and to guard against the rectum being injured.

On Suturing or not Suturing the Vagina.—I began by following Wertheim, who only removed enough of the vagina to cover the cervix; but for a long time now I have removed the whole or nearly the whole of it. In my earliest operations (again following Wertheim) I left the vagina open and packed the extirpation cavity with gauze; later on I gave up packing but left the vagina open; and later still I took to suturing it up and leaving the cavity undrained. If, however, the whole of the vagina is removed it is impossible to suture the open end, which is practically at the vulva, because the bladder overhangs it too much, so that I have now gone back to packing the extirpation cavity, using gauze wrung out of a 1 in 2000 solution of flavine, which is removed in 24 hours via the vulva. I believe this to be the best technique, for it saves the time taken to suture the vagina, whilst flavine is somewhat of a styptic besides being a strong antiseptic.

Removal of the Regional Glands.—Wertheim himself removed the regional glands only when he deemed them to be cancerous, but from the beginning I have removed them as a routine. There are two groups of these glands on either side: (*a*) those lying along the inner side of the iliac veins, and (*b*) those lying in the obturator fossæ. The second of these two groups is the most important, for it is the earliest to become permeated and it is also the one most likely to escape observation because the contents of the obturator fossa are hidden by a screen of tissue in whose upper edge runs the hypogastric artery. The glands along the iliac veins are easily seen and stripped off, but to get fair access to the obturator fossa it is necessary to remove the hypogastric artery. This is effected by dividing it at the lateral corner of the bladder and pulling it back up to its origin from the anterior trunk of the internal iliac artery, where it is ligatured and again divided.

The fossa is filled with a wad of fatty tissue, which has a rat-tail extension downwards and forwards almost as far as Poupart's ligament. The glands lie in this fat, and the obturator nerve which traverses it must be gently disengaged, care also being taken not to injure the obturator artery or veins.

When the surgeon comes to deal with the fossa on his side of the table he should cross to the other side so that he can see what he is doing; otherwise he stands in danger of injuring the tributaries of the internal iliac vein which run in the same line as the hypogastric artery, but half an inch or more deeper down. This track of tissue is a danger zone and one should keep clear of it unless it is infiltrated; for if these veins, which form a regular plexus, be opened, free bleeding follows, very difficult to arrest, and much time and blood is lost.

Duration of the Operation.

Every operation has an optimum time-period for its accomplishment, the duration of which depends on the nature of the various risks of the operation, and the proportion they bear to the total risk. Thus, in the case of an operation whose principal risk is the bleeding accompanying it, or the effect of the anæsthetic, or the exposure of large raw surfaces, the shorter the time of its performance the better. On the other hand, in procedures whose chief danger lies in the possibility of a suture line not holding, or of infection of the operation area from adjacent areas already infected, or of injury to vital organs or parts in its immediate neighbourhood, meticulous accuracy in suturing, painstaking antiseptic technique, and delicate dissection are the essentials for success, and the time taken counts for little in comparison.

As regards the effect of tissue injury, it is important to remember that it depends not only on the actual amount inflicted, but also on the time-period over which the infliction is spread. Thus, a pound weight dropped on a man's head from a height of a yard would certainly stun him; whereas a half-ounce weight dropped from the same height 32 times at intervals of a minute would merely give him a sore head. Traumatic shock is the result partly of tissue injury and partly of tissue exposure; and of these two factors the first (other things being equal) is minimised by slowness, and the second by speed. The optimum time-period of performance of an operation will therefore be most often arrived at by the surgeon who strives to reconcile the conflicting claims of the several risks involved in it, and not by him whose object is merely to get through it as fast as possible. For Wertheim's operation, entailing as it does much tissue exposure and more or less continuous oozing of blood, it is obvious that a certain rapidity of performance is always desirable, and more especially in those cases to which I have referred in which the oozing is profuse. Assisted by Louis Rivett I once performed it from start to finish in 27 minutes, and on several occasions I have accomplished it in under 40 minutes. Nevertheless, I have of recent years made speed less of an objective than I used to do and concentrated more on accuracy of detail, to the betterment of my results. It is impossible to lay down a rule because cases vary so much in difficulty, but on the average I should estimate that

the operation should take about an hour and a quarter. The surgeon should, however, have at his command sufficient dexterity to shorten this time very materially if in any particular case it is desirable.

Immediate After-Treatment.

Some patients are considerably shocked by the time they leave the table, but a much larger number develop symptoms of shock an hour or more afterwards as the effect of the ether wears off. To combat shock I used to fill the abdominal cavity with warm saline just before finally closing it, but this is only practicable if the end of the vagina has been sewn up. Saline venous infusion is of the greatest value if it is carried out *immediately* after the operation, but the longer the time allowed to elapse before it is resorted to the less good will it do. I therefore nowadays often administer it on the table, even in cases whose condition appears quite satisfactory, so as to anticipate the supervention of shock symptoms some time later. Blood transfusion has proved of enormous benefit, especially in cases of delayed shock for, unlike saline infusion, which only gives good results when administered immediately, it acts equally well some hours after the operation.

Continuous saline infusion into the cellular tissue is a good adjunct to venous infusion and may be ordered in those cases in which the patient's condition is good enough not to need venous infusion. An electrically heated cradle should be employed during the period of shock, and camphor is the best stimulant to use.

Recurrence of the Disease.

About 68 per cent. of all recurrences occur before the end of the second year, and 90 per cent. before the end of the fifth year. Of the 107 recurrences in the series I am presenting here, 21 occurred in the lower pelvis—that is to say, in the remains of the vagina, the bladder, or the rectum; 49 in the upper pelvis, chiefly in the cellular tissue along its side walls, or in the pelvic bone itself, and in the track of the iliac vessels; 28 in the abdomen, chiefly in the tissue behind the peritoneum, or in the vertebræ; 7 in the lung; 1 in the brain; and 1 in the skin as multiple nodules. In this case the growth was a pure columnar-celled adenocarcinoma, which is uncommon in the cervix. Of the 284 cases, only 10 had this type of growth, though a tendency to columnar formation is not infrequently seen in patches in many carcinomas of the cervix, and I have seen an alveolar arrangement in the primary growth with an adenomatous arrangement in the secondarily affected glands.

Secondary growths are very rarely susceptible to further operative treatment and practically only when they occur in the remains of the vagina; of the few of that sort that I have removed all the patients died of further recurrence. I have on rare occasions, when the patients were quite young women, conserved an ovary. In two of these cases the growth recurred in the ovary left behind, and in one of them I was able to remove it. The operation was performed over ten years ago and the patient is still alive!

A considerable proportion of the patients who exhibited recurrence were treated by radiation, chiefly by X rays, but some by radium, but not one was saved.

Radiation as an Adjunct to Operation.—The vast bulk of the patients operated on by me received no treatment by radiation beforehand. Of the few that did, with a view to "making the growth operable," every one has died, either as the result of the operation or by rapid recurrence afterwards. I am of opinion that radiation, if a considerable interval has elapsed between it and the operation, increases the surgeon's difficulties, and that in those cases in which it has been claimed that it turned an irremovable into a removable growth the case was really operable before the radiation, only the surgeon did not know it. Moreover, I believe with Heyman that the chances of radiation producing a good effect are largely spoilt if the part radiated or to be radiated is subjected to operative disturbance, because the tissue reaction, to which equally with the damage done to the tumour cells the good effects of radiation are to be ascribed, is interfered with.

None of my patients has been treated by radiation after the operation, except in a few cases in which I was obliged to leave gross masses of cancer (either in the form of malignant glands or infiltrated cellular tissue) on the side wall of the pelvis because they were irremovable. These patients were treated by X rays directed to the area where growth was known to remain, but not in one single instance did the treatment prevent the cancer pursuing its fatal course.

Five-Year Survivals.—Of the 284 operations, the results of which I present to you to-day, 110 of the patients were free of recurrence five years after their respective operations. The relative cure-rate, or the proportion of five-year survivals to the total number operated on, is therefore 38·7 per cent., not deducting from the count the 20 patients either lost sight of or died of other diseases; or, in other words, counting them as having died of cancer. If, however, these 20 patients be deducted from the count as is statistically more accurate, the relative cure-rate is 41·6 per cent.*

Ten-Year Survivals.—Five years' survival after the operation cannot, however, be considered as absolute proof of cure, since about 10 per cent. of the total recurrences occur between the fifth and tenth years. Up to the end of 1919, or ten years ago, I had performed 181 operations whose results on the basis of ten years' survival are as follows:—

Died of operation	31	(17·1%)
Recurred before 10 years	67	
Lost sight of before 10 years	19	
Died of other diseases before 10 years	9	
Ten-year survivals	55	
	181	

Counting as though they had died of cancer the 28 cases lost sight of or died of other diseases before ten years, the relative cure-rate (real cures now) is 30·3 per cent., or deducting from the count the aforesaid 28 cases, 36 per cent.

Effect of Glandular Involvement.—The chief advantage of Wertheim's operation over every other form of treatment, the results of which have up to now been published, is that it gives a definite chance of permanent cure, even to patients in whom the regional glands are cancerous by the time they seek advice. Of the 284 cases operated on by me from 1907 to the end of 1924, the regional glands removed at the operation were cancerous in 124 and not cancerous in 160. The gland involvement-rate was therefore rather over 43 per cent.

The results in these two groups of cases are as shown in Table I.

Table I.

—	Glands free.	Glands involved.
Died of operation	19	28
Recurred before five years	47	60
Lost sight of	7	5
Died of other diseases	6	2
Five-year survivals	81	29
—	160	124

The five-year survival-rate for the gland-free group is therefore 49·9 per cent. without deductions (see back) or, with deductions 55·1 per cent.; whilst for the gland-involved group it is 23·3 per cent. without deductions, and 24·7 per cent. with deductions. My ten-year figures show a similar difference. The chance of cure, therefore, in a case in which the regional glands are not involved, is rather over twice that of a case in which the regional glands are involved, but

* The former method prevents concealment of unfavourable cases.

the difference to my mind is less to be wondered at than the fact that even when the operation is carried out against such a handicap as already involved glands, one patient in five is cured by it.

The Absolute Cure-rate.

The absolute cure-rate is the proportion of five-year survivals to the total number of patients presented to the surgeon. As regards myself, this total number has to be estimated, for I have no actual figures covering the period 1907–24. Between the years 1907–11 Comyns Berkeley and myself, who were working in concert, were able to keep accurate count of all the cases seen by us, both at Middlesex Hospital and Chelsea Hospital for Women, for we were the only surgeons performing the operation in those hospitals at that time. During that period 112 cases presented themselves to us, and of these we operated on 70, or 63 per cent. From 1911 onwards it became increasingly difficult to keep such a count, because our colleagues at Chelsea had begun to do the operation too, whilst I was presently translated from the out- to the in-patient staff, so that the cases coming to the hospital were no longer entirely presented to us; moreover, Middlesex Hospital (to which on account of its incurable cancer wards an undue proportion of advanced cases had always been sent), became known as a radium centre, and the number of these became so increased that the patients presenting themselves no longer constituted a fair sample of the cases of carcinoma of the cervix in the community at large. We therefore gave up as futile the task of disentangling the cases in which we determined the treatment from those in which the treatment had been determined by others, and in all our subsequent communications continued to reckon our operability rate as 63 per cent., and to deduce the total number of patients seen from that figure.

In the figures now to be given (Table II.) the total number of cases seen by me during the period covered by the series is reckoned on the basis that my operability rate has remained at 63 per cent. throughout the period the series covers, though in fact I believe it to have been materially higher in the later years.

Table II.

—	Cases seen.	Cases operated.	Five-year survivals.	Absolute cure-rate (per cent.).
No deductions ..	450	284	110	24·4
Deducting cases lost sight of and died of other diseases ..	430	264	110	25·5

Though I have not been able to keep actual count of all the cases I have seen in my hospitals, I *am* able to give the number I have seen in my private consulting-room. Between January, 1910, and the end of 1929 I saw privately 140 cases of carcinoma of the cervix, and of these I operated on 113 (some in hospital and some in nursing homes) so that my operability rate for these patients is 80 per cent. Up to the end of 1924 I had seen privately 106, and of these I operated on 83, or 78 per cent. The results obtained from this group of cases are as follows:—

Cases seen	106	Five-year survivals ..	38
Cases operated	83	Relative cure-rate (per cent.)	48
Operability rate (per cent.)	78	Absolute cure-rate (per cent.)	37·5
Operative mortality (per cent.)	9·6		

Both the "rates" are without deductions.

It may be argued that these patients, nearly all of whom were sent up to me by various medical men, form a selected group in whom the disease was early or relatively early. The percentage of gland-involved cases in the group is, however, 40 per cent., which, though less than the figure 43 per cent. which obtains in the whole series, is sufficiently high to show that in average advancement the growths were not very greatly different. On the other hand, this group of patients were in financial and social position above the average of those of the whole series and therefore as regards their general condition were superior material for operating upon. The better results obtained were chiefly due to this factor and substantiate what I said earlier in this paper—that the chief risk of the operation lies less in its severity, per se, than in the poor average condition of the patients. My chief reason, however, for giving the figures relating to this group is to show that in assuming my general operability rate for the whole of the series under consideration to have remained the same (63 per cent.) as it was when actually calculated in the four years 1907–10, I have rather under- than over-estimated it.

Comparing the results I have obtained from my series as a whole with the average results of the small group of highly skilled surgeons who have performed the operation on a large scale and also kept count of their figures, it is seen that as regards the proportion of five-year survivals to the total number of patients operated upon, my results are about the same as the average, whilst as regards the proportion of five-year survivals to the total number of patients seen they are rather better.

Table III.

—	Cases seen.	Cases operated.	Operability rate (per cent.).	Operative mortality (per cent.).	Five-year cure-rate (per cent.).	
					Relative.	Absolute
Wertheim	979	450	46	19	41·3	19
Mayer ..	545	343	63	19·9	31·2	19·6
Stoeckel ..	350	243	70	18·9	35·4	24·6
Zweifel ..	443	251	58	7·6	47·8	27·6
Franze ..	473	383	81	15	37	28
Bumm ..	263	179	68	12	43	28
Bonney ..	450	284	63	16·5	38·7	24·4
Fletcher Shaw ..	200	106	53	21·7	37·8	20
Total ..	3703	2239	60·4	16·4	38·7	23·4

It may therefore roughly be stated that the operation when carried out by surgeons skilled in its performance really *cures* (by that term meaning survival for ten years) rather over one in three of all the patients operated on, and rather over one in five of all the patients seen.

Future of the Operation.

In a paper quite recently published[1] I showed that the results I had obtained by Wertheim's operation were not only numerically better than any yet claimed for radium, but the number of five-year survivals achieved by the operation was obtained from a much smaller percentage of cases treated, for the radiologist, in order to obtain a certain number of cures, has to treat 96 per cent. of the cases seen by him, whilst the surgeon obtains a rather greater number from only 63 per cent. His remainder (excluding 4 per cent. too advanced to be treated by any method) can be treated by radium and a small number of cures obtained this way; whereas the radiologist has no such surplus, having used up his entire stock of available material in obtaining his results. The conclusion I drew was that at the present time the largest number of cures of carcinoma of the cervix were to be obtained by operating on the operable cases and treating the remainder by radium. I further showed that the advantage of surgery over radium lies in the former being able to cure a proportion of the cases whose regional glands are already cancerous by the time they seek advice, whereas in the case of radium all these patients are beyond its scope. The inability of the radiologist to distinguish beforehand the gland-involved from the gland-free cases presented to him is a great drawback, for it compels him to treat a number of patients not only uselessly but to the exclusion of the chance that surgery affords. The truth of the matter probably is that in certain cases

[1] Proc. Roy. Soc. Med. (Sect. Obst. and Gyn.), 1929, xxii., 53.

surgery, and in others radium, would give the best chance of cure, each case being a law unto itself in this respect, but our investigatory methods are too coarse and imperfect to enable us to discriminate accurately.

This is the position at present, but how long it will continue so remains to be seen, for the control of the forces of radio-activity is yet in its infancy and the future may see the power capable of disrupting the very atom into its component parts harnessed and directed to a degree only dreamed of to-day. We have, however, to deal with things as they are, not as they may be, and hence I deprecate as altogether premature the appeals that have been made to the younger generation of gynæcological surgeons not to embark on the operative treatment of cancer of the cervix, but instead to take up radium therapy, the present estimate of whose value in this connexion is founded solely on figures from abroad. Not until the results of reliable workers in this country are available shall we be in a position to properly appraise its effects, for it does not follow that the same measure of success attending a method of treatment in one country is necessarily attained when it is carried out in another country.

It has been objected against Wertheim's operation that its difficulty is such that only a few individuals are capable of performing it with success, but that is not the case. There is nothing in the operation that any surgeon of first-class aptitude cannot master, provided he will take the trouble to learn the technique from someone who has already mastered it. We hear a great deal nowadays about the necessity of radium treatment being confined to a relatively small number of experts in order that the best results shall be obtained, but no such demand has ever been made for surgical treatment, although the necessity was and is ten times greater.

The younger gynæcological surgeon of to-day does not start where I started, still less where Wertheim started. It is not now a matter of acquiring technical experience at the expense of his patients; the technique is already stereotyped, all he has to do is to serve an apprenticeship in it, follow it, and later on improve upon it. Nor is the extent of Wertheim's contribution to surgery only to be computed on the number of women cured of cancer as the result of it. The surgeon practising the operation is himself benefited, for besides arriving at a knowledge of the anatomy of the female pelvis obtainable in no other way, he gains a greatly increased confidence in the capabilities of his art and hence becomes a better exponent of it.

A Review

OF THE TREATMENT OF

INTRACTABLE DISCHARGE FROM THE NASAL SINUSES.

An Address delivered to Post-graduates at the Central London Throat, Nose and Ear Hospital on Jan. 24th, 1930.

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When nasal discharge becomes intractable and does not yield either to Nature or to ordinary treatment it is necessary to review the case in order to discover the cause of the intractability; the common cold furnishes us with the most simple example of pathological change which affects the nasal mucous membrane. These changes may be divided into three.[1]

Three Stages in Pathological Change.

Stage 1.—At the beginning of a cold the nasal mucous membrane reacts to the infection by an increase of secretion from its mucous glands.[2] If in this stage the mucus is examined microscopically it will be seen to contain a quantity of micro-organisms, the mucus being, in fact, secreted with the object of destroying them. If it does not destroy them the pathological process passes to the second stage.

Stage 2.—In the second stage Nature has given up the attempt to kill the micro-organisms by means of mucus, the increasing toxins from these micro-organisms paralyse the secretion from the mucous glands, and the nose becomes for a short period dry. The micro-organisms, thus partially deprived of moisture, have difficulty in obtaining nourishment, but their toxins pass through the nasal mucous membrane into the blood stream and in the severer cases the reaction they call forth produces fever. This reaction also produces immunity in the blood stream to these toxins and, when immunity has been established, the temperature falls. The irritation of the mucous membrane by the micro-organisms has during this period produced an outpouring of serum and leucocytes which together tend to destroy the micro-organisms.

Stage 3.—The reactive stage. When the destruction of the micro-organisms has proceeded far enough for mucus to effect their final removal, the mucous glands begin to secrete again, and in this stage the discharge is generally very free. Microscopically this discharge consists of mucus often containing many leucocytes, generally containing desquamated epithelial cells and sometimes micro-organisms.

Leucocytic and Serous Types of Cold.

There are, I find, two types of cold, the leucocytic type in which the micro-organisms cause leucocytes to be attracted into the mucus where they ingest the micro-organisms; and the serous type in which the micro-organisms are of a different tupe in that they do not cause leucocytes to pass into the mucus, and are destroyed by immune bodies excreted in the serum.

These two groups appear to correspond with what is known regarding general immunity, for there are certain micro-organisms which produce immunity and for which antisera can be manufactured, while there are others for which sera cannot be prepared for they produce no immunity in the blood. We find these two main groups clearly demarcated in the two types of cold.

The common cold not infrequently becomes intractable by reason of excess of inflammation in the nose. The leucocytic type of cold when it becomes intractable does so on account of sinusitis and the main symptom which the patient suffers is that of pain. This is often severe and sometimes incapacitates. It may be necessary to have resource to treatment for this case, and of the various treatments which we have at our command, cocaine in 5 per cent. solution in saline stands first. We spray the nose with this and try to cause the mucous membrane to contract sufficiently to permit the contents of the sinus to be naturally discharged. If this is not successful, it will be necessary to wash out the sinus. Now I have one rule in connexion with the treatment of acute sinusitis which I think is of paramount importance—namely, that in no circumstances do I wash out an acute sinus with a watery solution. We can assess what happens when we do so by mixing the contents of such a sinus with saline. We find that micro-organisms previously retained within the leucocytes, or in the mucus and serum, are liberated. Nature has produced an antibacterial fluid in the sinus and if we dilute it, it loses many of its antibacterial properties and the washing out of such a sinus with a watery fluid is, I think, a dangerous practice. We can, however, aspirate the sinus through two catheters introduced within its lumen, or we may wash it out with oils, of which medicinal paraffin is by far the best.

The serous type of cold when it becomes intractable does so on account of desquamation of the epithelium and of toxic absorption. It is comparatively rare to meet with pain from sinusitis in this type of cold, although the sinuses may be infected, for the pain is generally of the toxic type which affects the back and joints. If we examine the discharge in the period of reaction we find that the mucus contains large quantities of desquamated cells. Before recovery can take place these cells will have to be replaced by the regrowth of the nasal epithelium, and until they are replaced toxic absorption in some degree can continue. The treatment of a case of this type is by oily douches. In no circumstances should watery douches be employed for they will spread infection to portions of the nasal mucous membrane in which the epithelium is becoming re-established, and thus prolong the cold and, moreover, will give rise to an increase in the degree of toxic absorption. Further, should the infected watery fluid pass through the Eustachian tube, the epithelium of this may desquamate, and the cilia being absent from the deeper epithelial layers, there is no method of removal of the micro-organisms which will spread along the tube and tend to cause acute otitis media.

Production of Sinusitis.

Reference has been made to the two main types of cold, and it is clear that they may in many cases infect the nose synchronously. In such a case where leucocytic and serous reaction are present at the same time, neither of these reactions seems to be generated to its full extent, and recovery is delayed. This is the type of cold that produces sinusitis with toxic absorption and it is by far the most difficult cold to deal with. In this connexion we have to remember that in the early stages of a cold of this type the body has but little immunity to certain of the organisms. If it becomes necessary to open any sinus under such conditions, the veins within the bone are easily infected and a spreading osteitis may occur, sometimes with most disastrous consequences. In the treatment of a sinusitis complicating a cold, every effort should be made to avoid inflicting any trauma on the bone, and if it becomes necessary to open any sinus because we cannot pass a catheter within it, it is most essential that the opening of the bone should be made through an area in which large intra-osseous vessels are not present. Such areas exist in the lower wall of the frontal sinus[3 4 5] and far back on the naso-antral wall beneath the inferior turbinate.

Under suitable conditions a mild cold recovers by itself, or as a result of palliative treatment of the nasal mucous membrane. The results of palliative treatment may, however, easily be annulled if reinfection constantly occurs. Such reinfection may be air-borne or finger-borne. Air-borne infection may occur from other people's septic teeth as, for example, when a mother has pyorrhœa and constantly infects her child, or when a clerk has well-marked nasal or dental sepsis and infects the air around him. On the other hand, reinfection in children constantly occurs when they introduce their fingers into the nose. In a few cases patients will reinfect their nose after an antral operation by failure to sterilise the cannula which they employ for douching.

The nasal mucous membrane in the stage of recovery from a cold regrows the epithelium which has been desquamated during the active process, and also forms additional new mucous glands if the state of recovery is prolonged, and the presence of micro-organisms in the nose producing active inflammation tends to produce new fibrous tissue in the mucous membrane. Should the process of recovery be prolonged, one of these three factors will predominate. If mucous glands grow in excess we term the process hypertrophic rhinitis, though here the congestion may produce an actual increase of the periosteal bone so that the hypertrophy may be of bone and mucous membrane. If, on the other hand, fibrous tissue has been produced in great excess a fibrotic type of atrophy will follow. If the desquamation has been excessive, a crusting type of atrophy will be found and toxic absorption will be present in considerable degree with resultant manifestations in the joints,[5] or in the fibrous tissue around the peripheral nerves. Deficiency of the blood-supply to the mucous membrane (such as occurs in the anæmias and in syphilis) will expedite this second type of atrophy.

We have not so far spoken of the olfactory area of the nose. This is the area above the middle turbinate, and here the secretions have a different nature in that they are watery so as to dissolve odiferous substances and thus permit them to stimulate the endings of the olfactory nerve. This area is one in which inflammation may be dangerous, for the olfactory nerves are sheathed by lymphatics which convey the lymph from the nose to the meninges.[6] Should an intractable rhinitis be present in this area, oily solutions should be employed, for these seem to prevent absorption of the toxins by these lymphatics.

Chronic Intractable Sinusitis.

Theory of the "Master" Sinus.

In chronic sinusitis examination seems to prove that all the sinuses are equally infected. It is rare, however, that this is actually the case, for generally there is a master sinus which infects the others, and this sinus only is in a stage of inflammation from which it cannot recover without aid, while all the other sinuses will recover of their own accord if reinfection from the master sinus can be stopped. These cases of sinusitis differ very greatly in the amount of discharge which they emit. In some the discharge is slight in quantity. An X ray of such a case will generally show no alterations in the sinuses, but should we have the good fortune to examine such a case when it is recovering from a cold, the master sinus recovers less quickly than the others, and this alone will be dull upon the radiograph. In other cases where the sinusitis is of high degree the character of the secretion aspirated from the sinuses may indicate the master sinus, for in the master sinus micro-organisms may be seen free in the secretion, while in the other sinuses they are absent, or are contained within the leucocytes. The treatment will depend on the type of sinusitis we are dealing with, but in all types the same general rules of treatment will apply. These rules may be expressed as follows. We wash out each infected sinus and note if washing out produces an improvement. If on each washing out there is considerably less discharge this process is continued until cure results. Whether we should wash out with oil or with water will depend on the type of case with which we deal. If, on the other hand, washing out produces only temporary improvement, we either catheterise the sinus and tie in a catheter through which the patient washes out the sinus as an in-patient, twice a day, or, in the case of the antrum, we open the antro-nasal wall so as to permit the patient to pass a catheter twice a day and so wash out the sinus. The type of patient will, to some extent, determine whether we operate or no. In children one lavage will generally cure the case and this is best done under general anæsthesia, which will also give an opportunity to remove infected adenoids or tonsils. In nervous ladies, some small opening should be made, under general anæsthesia, such as will permit them to wash out the sinus. In other persons it is generally possible to do all that is required under local anæsthesia, although on the first occasion it may be wise to give gas in addition, for after the first puncture the instrument can be introduced into the sinus without discomfort under local anæsthesia alone.

Atrophic Sinusitis and Rhinitis.[7 8]

If there is general crusting atrophy of the nasal mucous membrane, this is a contra-indication to the performance of all operations excepting those of urgency, for the devitalised tissues have but little power of recovery and general infection may quite

readily ensue. Patients with the fibrous type of atrophy, on the other hand, stand intranasal operations well in the rare cases when surgical interference is required. As regards treatment of atrophic sinusitis and rhinitis, the fibrotic type as a rule requires an oily douche to guard the mucous membrane from undue evaporation; the crusting type requires much more active treatment in that the crusts must be removed by means of forceps, or if need be by hydrogen peroxide, after which it should be kept free from crusts and treated as if the condition were an eczema. Calamine lotion may give good results, but in some will cake into hard masses. Should this be the case ointments of calamine in a base of lard, or vaseline may be substituted, while sometimes ichthyol and glycerin give good results. In every case the master sinus must be sought and dealt with.

Radiography.—The atrophic type shows no dullness on the skiagram to which the bones are more readily transparent than in the normal, and the hypertrophic type is almost always accompanied by thickening of bone which thus casts denser shadows on the radiograph. The presence of bone which is very penetrable to X rays will make us consider the question of operation with especial care, for the reaction of the tissues except in the fibrous type is likely to be slight.

Microscopy.—If we examine the discharge under the microscope and see free micro-organisms in the fluid, we shall, as a rule, do well to postpone operation until, as a result of treatment, such a degree of recovery has taken place that free micro-organisms are absent from the discharge. If we cannot succeed in this our operation should be limited to the smallest removal of the bone that will permit the patient to wash out the sinus for himself.

Hypertrophic Sinusitis and Rhinitis.

If there is hypertrophy of the mucous membrane of the nasal air-way the resistance of the intranasal structures is high; an operation can be done with practically no risk whatever. There are certain cases of sinusitis in which the degree of hypertrophy is so great that we may feel certain that intranasal operation and douching out the sinus will not effect a cure. In such a case there may be polypi and these may be present in the antrum, where their presence may be demonstrated by a radiograph after an injection of a suspension of finely powdered bismuth oxycarbonate into the antrum. This method will also serve to show the existence of a carcinoma of the antrum. Lipiodol should be substituted for the bismuth in the sphenoid or the frontal sinus. If we find sinusitis of this hypertrophic type we should open the antrum from the outside and thus remove the polypi. If the polypi are in the frontal sinus it will be necessary to open this after the methods originally popularised by Howarth and by Kisch. It is rare to find polypi in the sphenoidal sinus but they are common in the ethmoid, and as they generally grow from bone which is devitalised and carious, it is in these cases necessary to exenterate the ethmoidal labyrinth.[9] In any intranasal operation the most gentle technique which is consistent with thoroughness will produce the quickest and most lasting cures.

Factors in Production.

Rôle of Dental Sepsis.—Abscesses at the root of the molar teeth will not infrequently infect the antrum. When they do so the sinusitis may be one of two types: either the abscess actually bursts into the antrum which undergoes rapid inflammation and becomes filled with fœtid pus, or the abscess causes periostitis beneath the antrum and the mucous membrane thus becomes inflamed. It is of paramount importance to deal with every form of dental sepsis complicating sinusitis and it will not be sufficient to examine the teeth superficially, for in several instances the dental sepsis has been revealed only by a skiagram.

In other cases pyorrhœa may produce general toxæmia, or may indirectly cause infection of the antra. In yet other cases the pyorrhœa may cause infection of the air around the patient, and he may infect not only other people but himself. A form of atrophic rhinitis from this cause is not unknown.

Rôle of Nasal Obstruction.—If nasal obstruction is present it may diminish the opening of the nasal sinus so that it affects the drainage of this into the nose. In such a case cocaine will generally free the opening temporarily and should be used in all acute conditions. It is, however, necessary to free the obstruction by some form of operation in cases of sinusitis which do not improve. Nasal obstruction may play another part in producing sinusitis in that the tortuous air-way which a deflected septum produces causes a considerable area of the mucous membrane to be out of the inspiratory air current, as a result of which the rôle of dust removal falls upon a similar area of mucous membrane which tends to become more easily inflamed. Sinusitis and rhinitis can then be produced with a less degree of infection than would cause the same condition were all the nasal mucous membrane presented to the air current in the normal manner.

Environment after Operation.

We shall do well in treating sinusitis to consider the environment to which the patient will be going after operation. If he is going to a dusty climate, such as may be met with in certain portions of Australia or South Africa, every effort should be made to conserve as much as possible of the mucous membrane. If we remove the middle turbinate and portions of the inferior we shall not leave enough mucous membrane to deal with the environment of dust, and when a mucous membrane is subjected to more trauma than it can resist it will become atrophic, and this is the fate of many operations designed to give the best results in England when the patient moves into a dusty climate such as those which we have mentioned.

Disorders in the General Health.[10 11]—It is not infrequent to find cases of intractable sinusitis which recover spontaneously on improvement of the general health, or in which success by local treatment or by surgery can only be obtained when the patient's general condition can be improved. In this connexion we have had to consider causes of toxæmia other than those emanating from the infected sinus. Such conditions may be met with in the bowel as a result of chronic constipation or appendicitis. In considering a case of sinusitis, therefore, it is necessary to avoid the errors which arise from considering only the region of the nose. Many a cold which showed signs of becoming a chronic sinusitis has been cured by a timely dose of castor oil. Many a case of chronic ill-health apparently due to sinusitis has been cured by dealing with the appendix or the gall-bladder. In older people the presence of chest conditions has frequently led to failure to recover from conditions in the nose, while cardiac conditions may not infrequently predispose to nasal inflammation. Active tubercle and syphilis must always be sought for in patients whose health is poorer than the clinical signs will warrant.

As regards the general state of toxæmia met with in certain of these patients, it would appear that liver diet, or the extract administered hypodermically, is extremely valuable in raising the resistance during treatment.

The condition of the skin is of considerable importance. There can be no doubt that persons with an acid skin stand operations badly, though whether this be by reason of a diminished elimination of certain poisons by the skin, or because they have some degree of acidosis, does not seem clear. Certain it is that the removal of all secretion from the skin by frequent washing is important in patients in whom the powers of resistance are diminished.

As regards acidosis, or rather the compensation for the acidosis, we meet with this condition so frequently in toxæmia, and it is so important as an agent in preventing the recovery of intractable sinusitis, that one feels that the compensated acidosis and the toxæmia must in some way be dependent

on each other. Certain it is that if we give a patient a sufficient quantity of sodium bicarbonate to render the urine slightly alkaline, that immunity is often re-established where previously the patient suffered from toxæmia. It is good practice, therefore, to assess the degree of acidosis which is compensated and to remedy this during the period of treatment. The use of alkalis must not be long continued or phosphatic stones might possibly be formed within the hilus of the kidney or bladder.

As to the use of vaccines in these cases, they are sometimes very successful if given in a special way. The method that I advocate is as follows. A culture is made from pus sucked from the interior of a sinus, and a vaccine is prepared from it. A very small dose of vaccine is then injected into the superficial layers of the dermis, and not hypodermically. This forms a bleb upon the skin, and if the vaccine contains the toxins which are circulating a reaction similar to that of von Pirquet occurs. By the degree of reaction the appropriate dose of vaccine may be gauged. This is a matter of some importance, for an overdose of vaccine can debase immunity for a considerable period. When the appropriate dose has been discovered, vaccines may be given hypodermically with an occasional intradermic dose to estimate the degree of reaction to the vaccine. There are certain types of sinusitis and rhinitis in which violent and painful reactions of the nasal mucous membrane occur at quite irregular intervals, and during an attack the mucous membrane is vermilion red. These are probably cases of susceptibility to some air-borne vegetable or animal protein, together with the ordinary inflammation of a sinusitis. The mucous membrane in these conditions permits absorption very readily, and if a tiny but increasing dose of vaccine is sprayed into the nose the mucous membrane sometimes reacts to this and a local immunity may be thus established. In passing it may be mentioned that cases of this type are entirely unsuitable for any sort of operation other than simple lavage of the sinuses.

Suggested Lines of Treatment.

If the condition is one of atrophy with crusting in the nose and often with offensive smell, the following line of treatment will often give most excellent results. The nose should first be cleansed of crusts and discharge with hydrogen peroxide and if necessary the crusts should be removed with forceps. When it is clean it may be packed with gauze, soaked in the following solution and this retained in the nose for 24 hours.

℞ Iodoform .. .. grs. 30.
Bismuth subnit. .. grs. 60.
Paraffin liq. .. ad oz. 1.

After removal the nose is cleansed twice daily, first by douching with saline, then with

℞ Hydrogen peroxide .. vols. 20, oz. 1.
Normal saline .. ad oz. 10.

This should be warm and the strength of the peroxide should be increased until slight stinging follows its application. The nose should then be vigorously blown and the following solution swabbed into the nose with wool:—

℞ Calamine .. .. grs. 60.
Glycerin .. .. dr. 1.
Aqua .. .. ad oz. 1.

This treatment, which is based on treating nasal atrophy as if the condition were one of eczema, gives good results only in so far as it removes the greater portion of the inflammation from the portion of the nose which lies within the nasal air-way. It does not however reach the sinuses, and if, as generally, these are affected they must be washed out. Saline may first be used for this but if it fails, as commonly, to stop discharge, a 1 per cent. solution of argyrol may be tried. A weak solution of iodine made by adding a drachm of the French tincture to a pint of saline may be used instead of the argyrol, and alcohol may be usefully added to this if the discharge from the sinus does not cease. My own belief is that we should never operate upon a case of atrophic rhinitis unless forced to do so by some urgent and acute complication, which is fortunately very rare. If the sinus condition does not clear up with treatment it is, I think, good practice to use formalin vapour as a means of treatment. The use of this is based upon the fact that workers in trades in which formalin is used do not catch colds and often lose their nasal infection when they start employment of this nature. We can copy this by placing a little 1 per cent. formalin in the patient's bedroom and allowing it to work while he sleeps, having first assured ourselves that the patient during the hours of sleep breathes through his nose. The formalin should never be so strong as to make the eyes water. Many cases will clear up when dealt with by this means, though some are irritated.

There is one type of atrophy which deserves special mention—namely, the type which follows operation and affects small areas of the nose and proves intractable to treatment. The atrophy here is incomplete and can as a rule quite readily be cured by application of a dull heated actual cautery. The most that we can do with any case of atrophy is to produce a functionless and fibrous type of mucous membrane. Discharge upon this membrane is extremely small in quantity but tends to dry and to form crusts. Such patients should therefore be provided with an oily douche such as the following:—

℞ Ol. pini .. .. ♏ xxx.
Paraffin liq. .. ad oz. i.

This should be instilled daily into the nose with a medicine dropper; sprays do not yield sufficient oil to serve the needs of such a mucous membrane.

In acute cases a masterly inactivity gives the best results provided that we raise the general resistance. It is good practice to combat the acidosis by means of alkalis or fruit juice, for the temperature frequently falls and the local condition improves directly the urine has become alkaline. If this fails we may douche the nose with oils such as liquid paraffin, but never with a watery solution. If there is reason to believe that pus is retained within a sinus we should contract the mucous membrane with cocaine and try to cause the pus to escape. If this fails I personally try to introduce soft catheters into the frontal or the sphenoid sinus. These are stiffened with wire which is withdrawn when the catheter is in position. The sinus is then douched with oil and generally clears up.

If there is an empyema of the maxillary antrum this should be washed out by making a very tiny opening well back in the nose beneath the inferior turbinate. Oil should be used for washing out. If the antrum is infected by a carious tooth this should on no account be removed during the acute stages of the inflammation lest sepsis spread to the diploë of the alveolus.

Cases in which an acute sinus condition has complicated influenza must be watched for some time afterwards with considerable care, lest an intractable rhinitis manifests itself later.

Hypertrophic Rhinitis.—In this condition we have evidence that the mucous membrane has reacted to the infection. We have two types of this complaint, the infected and the uninfected. In the infected type we can find free micro-organisms in the discharge, or micro-organisms in the leucocytes. These cases show for the most part intermittent symptoms. They should be treated with respect. The master sinus should be found and carefully washed out. If the discharge becomes less each time the washing out will cure the case. If the discharge does not decrease with the washing out, we shall have to wash out more frequently and, therefore, must perform an operation in order to permit the patient to do this for himself. This is the reason of opening the antrum in the majority of cases. The frontal sinus and the sphenoid demand severe operations to remedy

discharge within them. Every effort should therefore be made to clear up this discharge by palliative measures. Similar remarks apply also to the ethmoids. We should always bear in mind the possibility that a dental sepsis is keeping up discharge.

Non-infected Type.—In this the mucous membrane has killed the micro-organisms and continues to discharge mucus from the glands which have been produced in extra numbers during the period of inflammation. These simple uninfected cases are readily diagnosable by the microscope, for the mucus contains no micro-organisms and few, if any, leucocytes. A simple nasal douche will in course of time cause the discharge to disappear.

Obstructive Type.—The nasal air-way may be obstructed on one or on both sides. The tortuous characters of the abnormal passages will throw the work of removal of micro-organisms on to a very small area of the mucous membrane. This may become inflamed and inflammation may readily spread to sinuses. This will not then get well unless the cause of this same inflammation is removed and the tortuosity of the abnormal passages removed by resection of the septum and by moulding the turbinates into more normal positions, removing such portions of them as are greater than will be required.

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ALKALOSIS IN CONGENITAL HYPERTROPHIC PYLORIC STENOSIS.

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THE occurrence of alkalæmia in gastric and intestinal obstruction has been recognised for a decade. A summary of the literature appears in a contribution by Hartmann and Smyth,[1] and these authors submit a series of blood and urine analyses in cases of intestinal obstruction in part of the alimentary canal. Ten cases of their series were suffering from congenital hypertrophic pyloric stenosis and, of these, eight had a raised bicarbonate reserve in the blood. In view, on the one hand, of these results, and, on the other, of the commonly held view that acidosis is to be expected in this malady, it was decided to investigate all the cases of congenital pyloric stenosis occurring in the wards of the Hospital for Sick Children and the Infants Hospital from the point of view of blood reaction and salt content, and associated changes in the urine.

Methods.—The hydrogen-ion concentration of the blood was investigated by the method of Martin and Lepper[2] and the plasma bicarbonate by that of Stillman, Cullen, and Slyke modified (W. W. Payne). Blood is obtained from a puncture of the finger, ear, heel, or great toe, and allowed to flow under liquid paraffin in a tube of the type described by Martin and Lepper.[2] Potassium oxalate or heparin is used to prevent clotting, and about 0·5 to 1 c.cm. of blood can usually be obtained from one puncture without much difficulty. The blood is mixed by rotating the tube through its long axis, and is then centrifuged. The top of the collecting tube is removed and 0·1 c.cm. of plasma is pipetted into a cordite tube two inches in length. The pipette is washed out twice with 0·1 c.cm. of neutral normal saline and the washings added to the cordite tube; 0·5 c.cm. of HCl (N/100) is then added. This stage of the procedure should be completed as quickly as possible owing to the possibility of glycolysis, which may cause a low result. Subsequent manipulations may be delayed for several hours without any alteration in the results.

The carbon dioxide liberated by the hydrochloric acid is removed by shaking the cordite tube for three minutes under reduced pressure. This may be done by applying to the mouth of the cordite tube a rubber cork pierced by a glass tube attached to a water pump. Next are added 1·8 c.cm. of neutral normal saline and 0·15 c.cm. of phenol red solution (0·02 per cent.), and the mixture is titrated with caustic soda—N/50 (carbon-dioxide free)—to pH 7·6, using a micrometer syringe (Trevan [4]).

Before the actual titration of the plasma is commenced, the acid itself must be standardised. For this, 0·5 c.cm. HCl (N/100), 2 c.cm. of the saline and 0·15 c.cm. of the phenol red solution are placed in a cordite tube and titrated to pH 7·6. This titration must be repeated until constant values are obtained.

In calculating the results, the difference between the titration values of the HCl alone and HCl + plasma expressed as c.cm. of N/50 NaOH, is multiplied by 0·2. This gives the molar concentration of bicarbonate.

The blood chloride was estimated by the method of Claudius (somewhat modified) [5]; the urea according to Twort and Archer [6]; the hydrogen-ion concentration of the urine colorimetrically, and the urine chloride by Volhard's method, or as for blood.

The figures for normal infants are as follows: pH 7·35–7·42; plasma bicarbonate: 0·022–0·028 molar; plasma chloride: 0·096–0·106 molar; blood-urea: 0·015–0·04 per cent.

Results in Congenital Hypertrophic Pyloric Stenosis.

Of 34 cases of congenital pyloric stenosis, 28 had an increased bicarbonate reserve at some period before operation. In no uncomplicated case was acidosis present. On admission the plasma bicarbonate was found to be above 0·04 molar in 10 of the 34 cases. The pH of the blood before operation was usually increased, though not to the extent that might have been expected from the bicarbonate level. The chlorides, in general, varied inversely as the bicarbonate. The sum of chloride and bicarbonate molarities was reduced, cases with marked alkalosis showing as a rule the greatest reduction and cases with moderate alkalosis a slight reduction. It will be noted, however, that the total molarity was lower in cases with a normal bicarbonate reserve than in those with slight alkalosis. These findings are illustrated in Table I.

TABLE I.

HCO_3 molar.	pH mean.	Observations.	Cl molar mean.	Observations.	$HCO_3 - Cl$ mean.	Observations.
−0·03	7·41	3	0·095	9	0·120	9
0·03–0·036	7·42	9	0·090	9	0·122	9
0·035–0·04	7·46	7	0·081	12	0·119	12
0·040 −	7·47	10	0·075	16	0·118	16

Examination of individual cases shows that the sum of Cl and HCO_3 molarities may be high, normal, or low. It was high in two cases, normal in six, and low in 21. Copious doses of normal saline were given to all the cases. In only seven of these have more than one pre-operation record been made. Four cases show a rise of plasma chloride, but two show a definite fall in chloride, in spite of the subcutaneous salines.

Blood-urea.—It will be seen from Table II. that the association of blood-urea with total molarity, or with plasma bicarbonate alone, is not close. This accords with the findings of Graham and Morris.[7] The post-operative changes in the blood must be correlated with the appearance of subsequent vomiting. In cases without vomiting or toxæmia the plasma bicarbonate became normal in from two to four days, but in the other cases the return was delayed for a week or more. In five cases the blood-urea

TABLE II.

HCO_3 +Cl.	HCO_3 molar.	Urea per cent.	HCO_3 +Cl.	HCO_3 molar.	Urea per cent.
0·097	0·0431	0·032	0·118	0·0367	0·033
0·101	0·0397	0·149	0·118	0·0317	0·030
0·109	0·0340	0·045	0·119	0·0438	0·022
0·111	0·0440	0·050	0·119	0·0418	0·072
0·112	0·0411	0·039	0·122	0·0373	0·022
0·113	0·0317	0·030	0·122	0·0201	0·033
0·116	0·0290	0·064	0·123	0·0413	0·076
0·117	0·0437	0·050	0·130	0·0460	0·043
0·117	0·0410	0·017	—	—	—

was estimated before and shortly after operation. In all these an increase followed the administration of an anæsthetic. The increase in one case may be due partly to an intestinal infection.

Urine.—When the plasma bicarbonate was raised, the urine was found to be alkaline, with the exception of five cases. Before treatment chloride was absent from the urine, or present in traces only, in all except two cases, and this was true even of those cases where the plasma chloride was normal. Acetonuria was found only three times in 21 observations before operation. Therefore acidosis is absent from cases of congenital pyloric stenosis, and ketosis is rarely found. It was not always possible to gauge the level of alkalosis from the appearance of the patient. While pallor and drowsiness were common, and were suggestive of alkalosis, two of the worst cases in the present series appeared quite lively and of good colour.

Discussion.

The blood normally contains large quantities of chloride of sodium and other bases. When the acid gastric secretion occurs, chlorine ions leave the blood and an excess of base is left; this combines with CO_2, increasing the bicarbonate reserve of the blood. As the gastric contents pass into the small intestine, considerable reabsorption of chloride occurs, and the base chloride content of the blood is restored. When the pylorus is obstructed and vomiting occurs, the continued loss of HCl in the vomitus leads to a depletion of chlorine ions in the blood, and the base originally combined with them now combines with CO_2 to form bicarbonate. This relative excess of base bicarbonate is excreted to a variable extent by the kidney and the urine becomes alkaline. On the other hand, the low chloride level of the plasma leads to a retention of chloride by the kidney and the urine tends to become chloride-free. If the vomiting persists, loss of acid in the vomit and of corresponding base in the urine will lead to a diminution of the total amount of base chloride in the body. Further, the gastric secretion contains not only HCl but also sodium chloride, and the loss of sodium chloride directly in the vomit is added to the salt loss arising from the loss of HCl alone. This salt loss cannot be replaced from the salts of the food, because vomiting prevents their absorption.

Although the total salt content of the body is diminished, it does not follow that the salt content of the blood per cubic centimetre is lowered. This will depend on the loss of water relative to the loss of salt. There are three possibilities: (1) The loss of water is relatively greater than the loss of salt; (2) the loss of water is proportional to the loss of salt—i.e., the fluids excreted by the stomach and kidney are together isotonic; (3) the loss of water is relatively less than the salt loss. Under these circumstances the osmotic pressure of the blood will be diminished. Compensatory mechanisms are then brought into play, which have as their object the maintenance of the osmotic pressure by retention of substances normally excreted by the kidney. It has already been seen that in alkalosis the excess of plasma bicarbonate is excreted in the urine, but when the alkalosis is associated with a low osmotic pressure the excretion of this excess of alkali tends to lower the osmotic pressure still more. There are thus two abnormal conditions present, and that mechanism which helps to minimise one abnormality is bound to accentuate the other: excess of base in the blood requires the excretion of basic salts by the kidney, while lowered osmotic pressure calls for the retention of all salts, basic and otherwise. According to Hartmann and Smyth,[1] osmotic requirements are the more important, and base is retained by the kidneys, with an even greater increase in the plasma bicarbonate. In such circumstances, however, the acid products of metabolism still require to be removed, and they are excreted in the urine as such or in combination with ammonia. Therefore, in cases of pyloric stenosis when the osmotic pressure falls to a certain level, one would expect to find a further increase in the bicarbonate reserve of the blood and a change in the urinary reaction from alkaline to acid. Such findings are recorded in certain of Hartmann's cases, but in the present series they were exceptional. Thus, the sum of HCO_3 and Cl molarities was low in three cases and extremely low in four others, but in all these the urine was alkaline, while acid urines were associated with alkalosis in four cases, although the sum of HCO_3 and Cl molarities was only slightly below the normal figure.

Another possible means of maintaining the osmotic pressure of the blood is afforded by a retention of urea in the kidneys. Certainly, the blood-urea is often raised in congenital pyloric stenosis, but it has been noticed previously that the blood-urea does not bear a close relation to the sum of HCO_3 and chloride molarities. It is probable that both urea retention and base retention (with the excretion of an acid urine) depend on some factor in addition to the osmotic pressure of the plasma; possibly to deficient renal excretion. Thus, the loss of water from constant vomiting leads to profound dehydration and deficient circulation through the kidneys: this, in turn, might quite easily result in imperfect excretion of base (cf. Henderson and Palmer[8]) and of urea.

Reaction of the Blood.—The relatively small rise in pH associated with increase of the plasma bicarbonate must be explained by retention of CO_2. It is noteworthy that Graham and Morris[7] have observed that the respiratory exchange is diminished in these cases. This retention of CO_2 doubtless explains the infrequency of tetany in congenital pyloric stenosis.

Treatment.

Apart from the usual treatment with drugs and lavage it is necessary to administer large quantities of fluid because of the dehydration. As alkalæmia is present as well, no bicarbonate of soda should be given. It is probable that sudden death before and shortly after operation may be the result of alkalæmia, and this is more likely to occur if alkalis are being given therapeutically. Sodium chloride, on the other hand, is indicated, because it helps to limit the fall of chloride and rise of bicarbonate, and so tends to maintain the osmotic pressure of the blood. Indeed, copious saline infusions often bring about a striking improvement in the physical condition before operation, even in cases which at first sight appear quite hopeless. Probably it is worth while to delay operation in every case until about a pint of normal saline has been administered. If, however, it is not possible to introduce sufficient fluid, hypertonic saline (2 per cent.) may be used. Glucose may be combined with the saline, although this is not essential because of the rarity of post-operative ketosis.

Subcutaneous salines are also useful after operation in cases of continued vomiting or toxæmia. In the latter condition the patient lies semi-comatose, with twitching of the face and limbs; marked pyrexia may be present. The plasma chloride is low, the bicarbonate high, and the urine acid. The free administration of saline to two such cases resulted in rapid improvement. It should be noted, however, that vomiting several days after operation, with or without diarrhœa, may be due to an intestinal infection; in these cases acidosis tends to develop, with a rise in plasma chloride. In such circumstances it would be dangerous to give subcutaneous salines, but dehydration may be treated with glucose (6 per cent., oral or subcutaneous), and sodium bicarbonate may be given in addition if necessary.

Conclusions.

1. In congenital hypertrophic pyloric stenosis the plasma bicarbonate is increased and the chloride content of the plasma is lowered.
2. The reaction of the blood is only slightly more alkaline than normal.
3. The urine is alkaline and almost chloride-free.
4. Ketonuria is rare.
5. Marked improvement follows the administration of saline infusions in most cases.

Our thanks are due to the staffs of the Hospital for Sick Children and the Infants Hospital for permission to publish these investigations of their cases.

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LEUKÆMIA FOLLOWING TRAUMA.

A CASE AND COMMENTARY.

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THE important part played by trauma in the history of certain cases of myelocytic leukæmia does not seem to be generally recognised, and English references to it in the ætiology of the disease are particularly rare. It is perhaps because the whole ætiology of leukæmia is so obscure, and because the evidence of trauma as a causal factor is largely or entirely circumstantial, that a certain scepticism seems to prevail. Osler, in his "Principles and Practice of Medicine," mentions that "it has followed a blow"; Nelson's "Living Medicine" states that the evidence of injury to the spleen or bones is unproved; Christian in "The Oxford Medicine" thinks that fractures perhaps cause "secondary leukæmia," and he quotes a case of leukæmia following a fractured leg and accompanied by an enlarged spleen and a leucocytosis of 60,000, with recovery within three months. Allbutt and Rolleston regard the coincidence of trauma and leukæmia as accidental; Stevens, in his "Practice of Medicine," and Gulland and Goodall, in their book "The Blood," are of the same opinion; many text-books of medicine do not mention trauma at all.

The case below is recorded because of the obviously important part played by trauma in the history.

A man, aged 56, was admitted to the Prince of Wales's General Hospital under Dr. F. G. Crookshank on Dec. 6th, 1928. He was drowsy and somewhat incoherent, so that no information could be obtained from him except frequent

Cases of Trauma in the Literature.

No.	Sex.	Age.	Nature of trauma.	Period between trauma and— First symptoms.	Diagnosis.	Death.
1	M	24	Frac. tibia; blow left chest.	12 m. local pains and debility.	17 m.	—
2	M	21	Severe blow, shin.	3–4 m.	5 m.	—
3	M	29	Blow, right thigh.	1 w.	1 w. Sp.	6 m.
4	M	—	Blow shin, torn bones.	8 m. local pain.	11 m.	—
5	M	38	Three sep. inj. ribs in 6 m. all resulting in frac.	Directly after last injury, local pain.	2 m. later.	10 m.
6	—	—	Shot in knee; amputation.	Few d.	Few d.	—
7	M	44	Blow l. upper abdomen.	Im. local pain.	4 m.	—
8	—	37	Knock left side body.	1 y.	1½ y.	2 y.
9	—	—	Two hits in region spleen 1 y. apart. 16 y. later third blow splenic area.	Few w. after 3rd trauma.	6 m.	—
10	M	—	Crushed abdomen.	Directly.	—	Later.
11	M	16	General severe shaking.	1 y.	13 m.	14 m.
12	M	31	,, ,,	Soon after.	2–3 y.	Later
13	M	36	Kick l. upper abdomen.	1 m. local pain.	3 m.	2 y.
14	M	36	Injured foot.	Few w.	4½ m.	6 m.
15	M	—	Blow l. abdomen and gen. concussion body.	10 w.	10 m.	13 m.
16	M	21	Gen. concussion body.	7 d.	6 m.	—
17	M	63	Severe blow l. buttock.	6–12 m.	4 y.	—
18	M	30	Fall on abdomen. Blow chin and shin.	6 m.	6 m.	1½ y.
19	—	—	Crushed upper left abdomen.	Im.	1 y.	—
20	M	50	Crushed l. abdomen.	Im.	Few d.	2 y.
21	M	38	Blow r. chest and frac. rib.	3 w. local pain.	3 w.	1½ y.
22	M	35	Blow l. side body.	—	1 y.	—
23	F	57	Knock head and gen. shock.	Im.	Later	—
24	F	—	Kick l. subcostal. 21 m. later blow same region.	Few w. after 1st injury.	Few w.	3 w. after 2nd blow.
25	F	—	Blow l. abdomen.	Few w.	—	2 y.
26	—	—	Blow splenic area.	—	—	7 w.
27	M	—	Frac. ribs, both sides, many occasions.	— .	Later.	—
28	—	—	Blow l. abdomen.	5 w.	Few w. later.	—
29	M	50	Knock splenic region.	Im.	5 w.	9 m.
30	M	68	Blow shin.	—	—	9 m.
31	—	—	Blow splenic area.	—	Gradual.	—
32	—	—	Crushed spleen.	—	,,	—
33	M	37	Blow l. abdomen.	—	,,	—
34	M	38	Crushed abdomen.	Im.	—	1 y.
35	M	40	Blow l. thigh.	,,	—	—
36	M	37	Blow l. abdomen.	,,	1 y.	5 y.
37	—	—	Blow r. hip.	Few w.	—	1 y.
38	M	—	Blow l. abdomen.	Soon.	—	—
39	F	—	Fall abdomen.	10 m. local pain.	10 m.	10 m.
40	M	37	Blow l. chest.	Im.	1 m.	About 2½ m.

y = years; m = months; w = weeks; d = days; r = right; l = left. Sp = Splenectomy; Im. = immediate.

Author's Name and Extra Notes.

1. Neuman: Compensation given.
2. Liniger: Typhoid, healthy since; blood examination and examination of abdomen excluded leukæmia directly after accident. Compensation not given.
3. Stempel: Routine examination just before injury—no abnormalities found.
4. Schimert: Army examination before injury—no abnormalities. One week after injury—very large spleen. He discharged himself from hospital in very severe condition. 5. Schimert.
6. Mursick: Leukæmia and osteomyelitis of stump found at autopsy. 7. Mosler: Malaria twice.
8. Ponfick: Adhesions found round spleen at autopsy.
9. Thomsen. 10. Leuders.
11. Westphal: Spleen found to have been ruptured.
12 and 14. Ebstein. 13. Knoth.
15. Herman: Was found medically fit five months before injury; spleen not enlarged directly after injury. 16. Herman.
17. Herman: Malaria, healthy since; splenomegaly and general glandular enlargement. No report as to type of leukæmia.
18. Hermani: Compensation given. 19. Koschin.
20. Kutschera: Spleen not felt on 3rd day, but appeared on 4th.
21. Kutschera. 22 and 23. Grawitz.
24. Kaltenschnee: Leukæmia follows first blow and is much accentuated by the second.
25. Kaltenschnee: Compensation given. 26. Klemperer.
27. Schimmel. 28. Thiem. 29. Schattman. 30. Heschl.
31, 32, 33. de Chapelle. 34, 35. Schmidt. 36. Hindenburg.
37. Stempel. 38. Kaltenschnee.
39. Kaltenschnee: Splenectomy performed and death follows. Adhesions found round spleen. 40. Martinelli.

mention of "bad leg." The history, as furnished by his wife, was as follows: He and his family were quite healthy and none of them has suffered from a similar disease. The patient was perfectly healthy—in his wife's words, "I had never heard my husband complain of feeling unwell before the accident"—never missing a day in his occupation of store-keeper to a company of tyre manufacturers. On Oct. 18th, 1928, whilst removing a tyre from a wheel, a spanner struck him violently on the right shin bone, piercing his clothing and cutting the leg an inch across. This wound was dressed in the casualty department of a hospital, and the next day he resumed work and again hit his leg over the same region against a solid tyre. Owing to the local condition he was unable to resume work and about three weeks later he began to complain of undue fatigue, lassitude, and palpitations. During the next week or so the symptoms got worse and he went to bed. The leg completely healed in about a month, was painful most of the time, but was not septic.

On admission to hospital he was very pale (almost lemon yellow) and fairly well covered. The teeth and tonsils were septic; the papillæ of the tongue were normal. There were no skin or mucosal hæmorrhages, no œdema, and no glandular enlargement. Neither the spleen nor the liver could be felt. A hæmic bruit was present at the apex; the lungs were clear. The temperature varied between 99° and 101° F. The leg reflexes were sluggish; the left pupil was larger than the right. A blood count showed 1,600,000 red cells; a hæmoglobin percentage of 45; a colour-index of 1·4; and 56,120 white cells, consisting mainly of primitive cells of myeloblastic type. A few megaloblasts were also noted. The blood Wassermann reaction was negative. The patient complained of pain in the head, the leg, and the left subcostal area. Liver extract and stimulants were given, but he died on the fourth day after admission to hospital, 52 days after the first injury.

Extract from Autopsy Report.—There was a small scar over the right tibia; to this the skin was not adherent and there was no bony thickening. The spleen was about four times the normal size and the liver a little enlarged and fatty, but there was no glandular enlargement. The interior of the long bones and of the ribs showed the typical pus-like appearance of the marrow, with a few areas of bright red which may have been areas of infarction (Osler) or areas of red blood hyperplasia, as seen typically in Addisonian anæmia. The spleen showed microscopically the typical changes of a myeloid leukæmia.

Comment on Case.

In a case like this, where conclusive proof is absent, one is likely to be charged with reasoning post hoc ergo propter hoc. There are, however, features in the case which, coupled with the facts of others, make the accusation inadmissible.

The patient's health before the accidents was absolutely beyond suspicion, and in the absence of any symptoms, however slight, it is difficult to believe that he had leukæmia before the first blow. Admittedly, however, absence of the illness could have been indisputably established only by a full physical examination, including an estimate of the size of the spleen and a blood survey immediately before the trauma. It is equally true that no such examination was ever necessary on account of his excellent health.

In Case 2 in the table, a blood and an abdominal examination were carried out directly after the trauma and were completely negative, to be followed later by all the symptoms and signs of leukæmia. Later it will be shown that the type of trauma obtaining in the case described is one that is typical of traumatic leukæmia, and four cases are quoted where the trauma to the part has occurred on more than one occasion, as it had in this case. The leukæmia in this case cannot be ascribed to any other factor, definite or obscure.

Forty cases are tabulated here. The literature contains about 60 cases in all, but the evidence for the remainder is unconvincing. It appears from the table that:

1. The great majority of the cases are males (27 out of 31). Osler gives an incidence of two males to one female.

2. The average age is 38. Osler gives a range of 30 to 50.

3. No history of family tendency is found, and the personal history is usually clear. A history of malaria is recorded in two cases.

4. The type of trauma may be classified as (*a*) blow to long bones or ribs which may or may not result in a fracture; (*b*) blow in the region of the spleen, sometimes rupturing that organ; (*c*) a general severe shaking.

5. The trauma may be repeated. In two cases symptoms of leukæmia developed after the third injury, and in another case leukæmia developed after the first blow, the second blow causing an exacerbation which resulted in death three weeks after.

6. Diagnosis was established from a few days to four years after the injury.

7. The leukæmia was always of the myeloid variety except in one doubtful instance.

Death followed in 22 cases; from three weeks to five [illegible] the trauma (or last trauma).

Pain over the site of the trauma was a feature in many cases, often throughout the course of the illness.

General Commentary.

To establish completely the relationship of trauma to certain cases of leukæmia is difficult because of the obscurity in the ætiology of the disease. Gowers, 50 years ago, said:

"Very little is known of the causes, immediate or remote, to which splenic leucocythæmia is due. In a minority of cases some morbid condition or influence can be discovered to which the disease is sequential in time and of which it may be, in some degree, the result. In the majority of cases no such antecedent can be detected; the disease comes on in the midst of good or fair health."

He mentions four cases of leukæmia following a blow in the splenic region.

We do not yet know the cause of the disease. Various authors support the theories of infection, of a neoplastic process, and of hereditary influence. Sepsis, malaria, syphilis, pregnancy, hæmorrhage, severe exposure, and radio-active substances have all been cited as causes or part causes, and when it is remembered that the disease is three times as rare as Addison's anæmia (Allbutt and Rolleston give the incidence as 3 in 10,000 in Continental hospitals) it will be realised how hard it is to generalise. Piney states that

"the variety of stimuli capable of affecting the hæmatopoietic tissues is much greater than the number of possible modes of reaction; therefore identical reactions can result from widely different stimuli."

The trauma may be the means whereby the causative organism or virus enters the body. This theory is inadmissible in the majority of cases where there is no lesion of the integument, though in the present case there was a cut on the leg that took a month to heal completely. There is absolutely no ground for considering this theory acceptable.

The trauma may be the disturbance whereby a myeloid neoplasm is initiated. Sarcomata of bone are due beyond doubt sometimes to local injury, and carcinoma of the breast and of the stomach are sometimes directly traceable to a variety of trauma or chronic irritation. There is no reason why the hæmatopoietic system should be immune from mechanical stress; in fact, there is every reason to believe that the blood system is very susceptible to manipulation of any kind. The types of traumata described, occurring as they do over the long bones or ribs or near the spleen, are likely to influence the blood-forming tissues within, and a disturbance in one part is bound to have its effects on the other parts of the hæmatopoietic system. It is now well recognised that the various blood diseases are not rigidly circumscribed. The granular type of leukæmia may show non-granular proliferation and vice versa; Leube's leukanæmias are pictures of Addison's anæmia together with leukæmia, either of which entity may be the primary or the predominant one. Minot and Buckman describe three cases of erythræmia (Vaquez's or Osler's disease) which developed anæmia and several which showed myeloid proliferation; Winter and Ghiron had a patient with leukæmia who developed polycythæmia. How exactly the process of leukæmia is engendered by a traumatic disturbance of one part of the blood system is, of course, an open question, but it is easy to see that the process once started can become general. Medicine abounds in examples of apparently small causes with large results. The leukæmic process may start in the

following way. The blood-vessels of the blood-forming tissues are composed of histocytes (reticulo-endothelium) and the leucopoietic process occurs on the outer aspects of their boundaries. Piney says:

"it may well be supposed that any injury to the vascular wall will permit immature leucocytes to escape into the lumen and so reach the general circulation."

This may be the initial lesion following the trauma, after which it is not hard to imagine that a compensatory productivity of the reticulo-endothelium becomes excessive and the process advances throughout the system. There is abounding evidence of the neoplastic nature of leukæmia, which is only one of the many existing types of malignant disease of the hæmatopoietic system—myeloma, chloroma, and (?) lymphadenoma.

All the cases of leukæmia following trauma have been of the myeloid variety; there is no evidence of a lymphocytic leukæmia or of an erythræmia beginning in the same way through proliferation of the corresponding type of cell. The explanation in the former case may be that the specific portions of the non-granular formative tissue are not strategically situated for that type of stimulus, and in the latter case that the red-blood forming tissue is not so susceptible to abnormal stimulation as is the white (granular) blood forming tissue.

Obviously, trauma cannot be regarded as the cause of all myeloid hyperplasia, and even in those cases where it is causative it is probably not wholly responsible. Traumata to susceptible regions occur every day and no one can avoid them, and yet such cases as are recorded here are remarkably rare. Some other factor must be at work and in all probability it occurs as a susceptibility to the disease, a predisposition or diathesis. It is only the predisposed who get the disease, just as only the predisposed have a sarcoma at the site of a former injury. Addison's anæmia has been shown to be due to an inherent abnormality which may be brought out in one of many ways; leukæmia can be placed in a similar class. Without the precipitating influence of trauma or some other influence, such as malaria or syphilis, the disease may or may not develop in the predisposed person. There is some evidence that this susceptibility may be inherited or it may merely be congenital. Piney writes: "it is probably rare for a congenital anomaly of the hæmatopoietic tissue to be so extreme as to result in manifest disease without the interposition of some further stimulus. Such environmental changes may be internal or external."

Finally, reference must be made to the medico-legal aspect of this type of case. In the German series a note about compensation was found in four cases. Three of the cases were awarded pensions on the assumption that the trauma received at work was responsible for the consequent illness. The fourth case was refused compensation. Compensation was refused by the courts in the present case.

My sincere thanks for his helpful advice are due to Dr. F. G. Crookshank, who kindly let me use the clinical records of his case, and to Miss D. Frazer and Dr. M. Friedeberger for their assistance in the translations of German and Italian references.

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(*Continued at foot of next column.*)

SOME FURTHER NOTES ON THE RELATION OF CAROTENE TO VITAMIN A.

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It has been found by J. C. Drummond and co-workers [1 2] that the yellow pigment carotene, even when crude, is not a very active source of vitamin A, and more recently it is claimed that with increasing purification biological activity is progressively lost.[3] On the other hand, H. von Euler, P. Karrer, and co-workers, [4 5] T. Moore, [6 7] and the present writers [8] have found carotene to be a very active source of vitamin A, in which the activity increases with increasing purification. None of these workers has been able to divorce the biological activity from the pigment while the latter remained intact. Notwithstanding this failure the possibility still remains that the pigment and the substance responsible for the biological activity, in material derived from plants, are distinct substances, so closely resembling one another as to defy separation by the methods as yet tried.

In discussing the remarkably divergent results summarised above, it was suggested both by ourselves [8] and by Moore [9] that the exclusion by Drummond of fat from the basal diet of the experimental rats might be a significant factor in contributing to the negative result obtained by him and his colleagues. Those workers who had found carotene active as a source of vitamin A had always included fat in the diet. We have, therefore, sought to compare the effect of administering purified carotene, as the sole source of vitamin A, to groups of rats on diets devoid of and containing fat.

In the upshot, the presence or absence of fat in the diet was not found to have significance, but the solvent employed, in order to avoid the use of a natural fat as flux, was found to have a most important influence.

Administration of Carotene to Rats on Diets Containing and not Containing Fat, but Equally Deficient in Vitamin A.

Six young black and white rats of about 40 g. weight were used for the experiment and were divided into two groups. Each group contained one rat belonging to one litter and two rats belonging to a second litter.

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Westphal: See Schimert.

During the preliminary depletion period of the experiment all the rats received the following diet:—

Casein *	20	Marmite	4
Rice starch	72	Salt mixture * ..	4

Water was added to make a paste.

* British Drug Houses. "Fat and vitamin free."

Each rat also received daily one drop of ethyl oleate, containing 0·004 mg. of irradiated ergosterol, as source of vitamin D. The animals were kept in cages on fine wire screens. On this diet the rats grew poorly and were only slowly depleted of vitamin A.

On the sixtieth day in the case of one rat, and on the forty-ninth in the case of the other two, in one group, 16 parts of starch in the diet were replaced by 16 parts of hardened arachis oil. At the same time it was apparent that other modifications in the diet of both groups were necessary. The rats were seen to be failing for lack of vitamin B and were only saved by administration of a dose of dried yeast and by subsequently raising the amount of marmite from 4 parts to 15. So small an amount of marmite as 4 per cent. is certainly not reliable as a sufficient source of B-vitamins, although it is that commonly used by some workers. At the same time, in consequence of observations described later, the solvent for the irradiated ergosterol was changed from ethyl oleate to liquid paraffin.

When both groups of rats were becoming depleted of vitamin A, the carotene was administered daily in liquid paraffin; the daily dose per rat was 0·006 mg. For the first 22 days of administration the carotene was derived from spinach; when this material was used up, another batch derived from carrot was used; the latter was known from other tests to be of about the same biological value as the former and was used for the last 17 days of experiment. The carotene maintained its colour fairly well in the solvent though slow fading was apparent, but the dose of carotene selected, 0·006 mg., was chosen as being well above the known minimal dose (0·003 and 0·002 mg. respectively) for the two specimens of carotene used. There was thus a margin to allow for a gradual loss of potency and for a possibly only partial utilisation of the carotene from the solvent.

The two groups of rats were equally maintained in health throughout the 39 days of experiment; those which received fat in the diet actually grew slightly less than those which did not. It is thus shown that the utilisation of the carotene as a source of vitamin A was not dependent on the presence of fat in the diet. The details of the experiment are set out in the Table.

Growth of Rats on Diets Deficient in Vitamin A, to which 0·006 mg. daily of Carotene is added, as Source of Vitamin A, after a Preliminary Depletion Period.

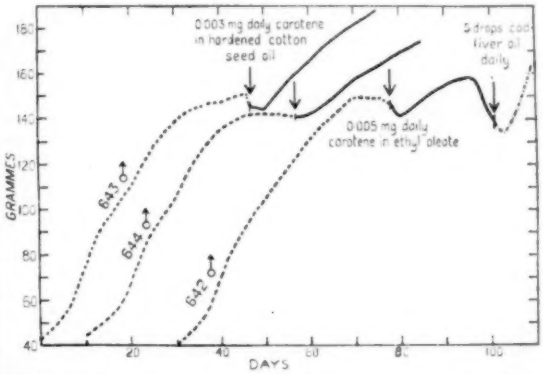
GROUP I.—Diet Devoid of Fat. II.—Diet Containing Fat.

Nature of diet.	No. of		Sex	Day of experiment on which carotene feeding—		Carotene feeding.	
	Rat.	Litter.		Began	Ended	Duration in days.	Growth during period (gms.).
I.	629	1441	F.	68	107	39	27
	648	1465	M.	56	95	39	28
	649	1465	M.	55	94	39	36
II.	630	1441	F.	68	107	39	18
	647	1465	M.	56	95	39	20
	651	1465	M.	55	94	39	24

Behaviour of Carotene in Different Solvents.

The use of a natural oil as a solvent for the administration of vitamin A in biological tests has been strongly condemned by Drummond,[3] who recommends ethyl oleate as a suitable solvent.[2 3] We have always used hardened cotton-seed oil as the solvent in our tests on carotene and have found it very satisfactory; there is probably a very slow decolorisation of the carotene, even in this solvent. In view of the discrepant results already referred to, it seemed desirable to make use of ethyl oleate as a solvent and to examine the behaviour of carotene in it.

The biological technique used was that usually employed by us;[4] the diet included hardened cotton-seed oil and sufficient dried yeast to supply at least one gramme daily, even to rats consuming the minimum amount of food. The carotene was dissolved in ethyl oleate and the solution was kept in a corked bottle in the cold room when not in use. It was found that in these conditions the carotene



Weight curves of rats on a diet deficient in vitamin A. After depletion period, treated with carotene, dissolved in either ethyl oleate or hardened cotton-seed oil.

was comparatively rapidly decolorised. Thirteen days after the solution had been made up the loss of colour was quite convincing and no positive biological result was obtained with carotene dissolved in ethyl oleate. The weight curves of rats set out in the accompanying chart have been selected to show a comparison between the behaviour of the same sample of carotene dissolved in ethyl oleate and in hardened cotton-seed oil, as a source of vitamin A. Rats 642 and 643 were males of the same litter; rat 644 was a male belonging to another litter. Rats 643 and 644, after being first depleted, received a daily dose of 0·003 mg. of carotene (melting point 172° uncorr.), derived from spinach and dissolved in hardened cotton-seed oil. Rat 642 received a larger dose, 0·005 mg., of the same carotene freshly dissolved at the beginning of dosage in ethyl oleate. From the chart it is seen that the two rats receiving the smaller dose of carotene, but dissolved in hardened cotton-seed oil survived the 28 days of the experimental period and grew well throughout. The rat which received the larger dose of carotene, but dissolved in ethyl oleate, grew a little for the first 17 days of the experiment, but then began to decline. When the loss in weight had amounted to 20 g. it was treated with cod-liver oil and recovered, showing that the failure had been due to a deficiency of vitamin A and to no extraneous cause. At the time when this rat began to decline in weight the carotene solution in ethyl oleate had passed from a deep orange to a light canary yellow.

The effect of various solvents in producing oxidation of carotene was therefore compared, the diminution in colour of the solution being taken as evidence of the progress of oxidation. Oleic acid (Kahlbaum), redistilled ethyl oleate, olive oil, and paraffin were chosen and 2·5 mg. of the pigment were dissolved in 2·5 c.cm. of each of these solvents and kept in open tubes. Solutions of potassium bichromate were made up matching in intensity of colour each of the solutions and were kept as standards for comparison. The paraffin solution was somewhat paler in tint than the three other solutions. A similar set of solutions was made up in tubes which

were then evacuated and sealed. In another experiment after being evacuated the tubes were filled with nitrogen before being sealed. All the tubes were kept at room temperature.

The colour of the solution of carotene in oleic acid fell off rapidly in the tube open to the air and at the end of a week the solution was completely decolorised, while in the same period the colour of the ethyl oleate solution had diminished considerably in intensity, and before the end of four weeks the colour had completely disappeared. The solutions, both in paraffin and in olive oil, remained for several weeks without apparent change and then a slow falling off took place. After three months a solution of carotene in olive oil, which had been exposed to the air, was still yellow.

The contents of the tubes sealed after the removal of oxygen showed a rapid falling off in the intensity of the colour in the oleic acid and ethyl oleate solutions, after which the colour remained for a long time without further change. The initial fading is most probably due to the incomplete removal of all oxygen from the tubes. All the three solvents, oleic acid, ethyl oleate, and olive oil, contain the oleyl radicle; it is possible that the oxidising action may be due to the presence of a small amount of linolenic acid, which forms very readily a peroxide, by means of which oxygen would be rapidly passed on to any substance dissolved in it. This oxidising action is somewhat less in ethyl oleate and very much retarded in olive oil. There is, however, no evidence that the olive oil contains less linolenic acid than does the purified oleic acid or ethyl oleate. Possibly the determining factor is the degree of solubility of oxygen in the different solvents. The addition of hydroquinone (1 part in 100,000) diminished but did not prevent the oxidation of the carotene, both in oleic acid and in ethyl oleate solution.

Whether the oleic acid and ethyl oleate are to be regarded as acting as pro-oxidants, or the olive oil as acting as or containing an anti-oxidant, it is clear that the use of either of the two former solvents is quite unjustified when dealing with a substance as susceptible to oxidation as is the highly unsaturated substance carotene.

Conclusions.

The presence or absence of fat from the basal diet does not appear to be a factor of any importance in determining the biological activity of carotene.

The unsuitability of ethyl oleate as a solvent for carotene affords a sufficient explanation of the discrepancy between Prof. Drummond's results and those of other workers on the activity of carotene as a source of vitamin A. Whether this fact supplies the whole explanation it is not yet possible to say. So far as our experience goes there is at present no evidence available finally to decide the relationship between carotene and the substance responsible for the biological activity in vitamin A of liver extracts. It cannot yet be decided whether carotene acts as a provitamin, as Moore [10] has suggested, or whether carotene from all sources is always accompanied by a constant percentage of impurity, which up to the present has defied all methods to separate it.

We are greatly indebted for grants, respectively, from the Medical Research Council and the Department of Scientific and Industrial Research.

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LIVER THERAPY IN ANÆMIA OF ALIMENTARY ORIGIN.

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IT is a well-established clinical fact that the anæmia resulting from cancer of the stomach does, in a certain small percentage of cases, resemble Addisonian anæmia. Text-books on medicine always include the differential features between these two conditions, and indeed without complete investigations it is sometimes impossible to arrive at a diagnosis. Gastric symptoms may be completely in abeyance, and the anæmia may dominate the clinical picture. The lemon-tinted skin, the anæmia, its symptoms and signs, with anorexia and flatulence, form a small but well-known clinical group of gastric cancer. While this possibility has been and is fully realised, the cause of such an anæmia has remained unexplained. Occasionally it has been attributed to the presence of secondaries in the bone-marrow, an explanation which has been found wanting in the majority of cases when they have been examined after death. Although hæmorrhage from the tumour site does occur and may be brought forward as a possible explanation of the anæmia, cases of marked anæmia are seen in which no bleeding can be demonstrated. While, therefore, the true cause of the anæmia has not been adequately explained, the advent of liver therapy, with its beneficial effect on primary anæmia, has renewed an interest in the relationship of these anæmias of alimentary origin to that of primary type.

Previous Observations.

Interesting observations have been recorded on some cases of gastrectomy for carcinoma, in which an anæmia has developed many years after the resection of the stomach and the autopsy showed no evidence of secondary growths, and no apparent cause for the anæmia. The oft-quoted examples are those of Moynihan[1] and Hartman.[2] While Moynihan's diagnosis was only clinical, Hartman's case showed a blood picture that resembled that of pernicious anæmia. The appearance of this type of anæmia following gastrectomy is, of course, rare and exceptional, for many surgeons have reviewed their series of gastrectomy and found no evidence of a primary anæmia, although a certain proportion of cases do show an anæmia of the secondary type. It is difficult to draw any conclusions from surgical cases, for gastrectomy is only a relative term, and in the majority does not mean total excision of the stomach—a procedure comparatively uncommon.

Dennig [3] reported quite recently the history of a man who had a gastrectomy performed on him in 1918 for a gastric ulcer who eight years later complained of paræsthesia and pain in the lower limbs.

The man showed pallor, a pale smooth tongue, ataxia of the lower limbs, diminished sensibility, and absent tendon reflexes. The blood picture was typical of pernicious anæmia: the hæmoglobin was 50 per cent.; red cells, 1,800,000; colour-index, 1·4; and white cells, 4800 (lymphocytes 65 per cent.). Anisocytosis was observed in the films. Four months' treatment with iron and arsenic and blood transfusions resulted in no improvement, the blood picture being: hæmoglobin, 35 per cent.; red cells, 1,400,000; and colour-index, 1·25. Megaloblasts were now present in the blood films. Liver therapy was commenced and the blood figures at the end of 14 days showed a hæmoglobin percentage of 60, and 2,300,000 red cells. Unfortunately, the man died of broncho-pneumonia 17 days after liver diet had been instituted.

Hochrein [4] also reports two cases of gastrectomy in which an anæmia resembling pernicious anæmia was found, and in both of which marked improvement followed liver therapy.

The first was a man, aged 55, who had had a gastrectomy for carcinoma eight years previously. The blood showed

hæmoglobin, 45 per cent; red cells, 1,560,000; colour-index, 1·7; and white cells, 6600. Megaloblasts were seen in the films. The blood figures after liver treatment showed: hæmoglobin, 70 per cent.; red cells, 4,800,000; colour-index, 0·84; and white cells, 6600, with an eosinophilia of 19 per cent. His second case was a woman who had had her stomach removed for gastric ulcer nine years previously. The blood picture was that of a secondary anæmia: hæmoglobin, 43 per cent.; red cells, 3,420,000; and colour-index, 0·79. Here again improvement with liver was noticed, hæmoglobin rising to 85 per cent., the red cells to 4,460,000, and the colour-index to 0·9. Hochrein thinks that, with the history of gastrectomy and the response to liver therapy, the anæmia was the result of the gastrectomy.

Crohn[5] refers to one of his cases of syphilis of the stomach, in which subtotal resection had been performed, which developed a severe anæmia of the primary type several years after the gastrectomy. It is interesting that, according to Crohn, anacidity is rather characteristic of gastric syphilis. In 1924 Garvey and Stern[6] published a report of a case in which the symptoms and signs of subacute combined degeneration of the cord were obvious, and in which were found an achlorhydria, high colour-index (but no marked anæmia), atrophy of the mucous membrane of the tongue, and lemon-tinted skin. Not, however, until the post-mortem examination was the presence of a carcinoma of the stomach suspected. The histological changes of subacute combined degeneration of the cord were verified by section. In 1925 Ellis[7] reported the details of a case in which a man underwent a partial gastrectomy for a carcinoma in 1909, and 16 years afterwards presented signs of subacute combined degeneration of the cord with a sore tongue and a blood picture suggestive of pernicious anæmia.

Details of Five Cases.

The following are the details of five cases, four of carcinoma of the stomach and one probably of the pancreas, in which liver therapy was given and observed. In all the following features were present: a lemon-tinted skin, symptoms of anæmia, and achlorhydria.

Case 1.—A man, aged 56, complained of dyspnœa on effort, and a lemon-tint of the skin which would "come and go." He had no gastric symptoms, enjoyed his food, and in all respects felt normal, with the exception of some shortness of breath on exertion for three months. Examination showed a definite yellow pallor in a well-built man. Fractional gastric analysis showed an achlorhydria with rapid emptying and no evidence of obstruction at the pylorus. Enlarged glands were palpable in the left cervical region, and a barium meal revealed a large filling-defect extending along the posterior wall of the stomach. The blood examination showed: red cells, 2,800,000; hæmoglobin, 43 per cent.; white cells, 10,200; and colour-index, 0·7. The film showed the red cells to be poorly stained but with poikilocytosis and some red cells larger than normal. As the condition was regarded as inoperable and no surgical relief of obstruction was necessary, liver therapy was given, and the patient's response observed.

In 14 days the following figures were noted: red cells, 3,640,000; hæmoglobin, 44 per cent.; white cells, 5200; colour-index, 0·55. Two months after treatment the dyspnœa had completely disappeared, no anæmia was apparent, and the patient seemed to be better in every way. The count was then: red cells, 4,650,000; hæmoglobin 76 per cent.; white cells, 7600; colour-index, 0·84. A short time afterwards the gastric symptoms became obvious, the patient began to vomit and signs of emaciation rapidly advanced, and he died a few weeks after the onset of obstructive symptoms. This case, although by no means an anæmia of primary pernicious type, showed a definite response to liver therapy and had, in addition, as well as a marked anæmia, an achlorhydria and a rapidly emptying stomach.

Case 2.—A woman of 50 complained of dyspnœa, yellow appearance, and palpitations of five months' duration, with loss of weight noticeable for two months. Clinical examination disclosed a tenderness in the epigastric angle, a lemon-tint of the skin, and a complete achlorhydria with high total acid values, blood in the resting juice, and a stomach empty in one hour. The barium meal showed a filling-defect in the region of the pylorus and a rapidly emptying pyloric canal. Operation was advised but was refused. The blood at this time showed: red cells, 2,250,000; hæmoglobin, 45 per cent.; white cells, 6000; colour-index, 1·0. A film showed moderate anisocytosis and poikilocytosis but no nucleated forms. The patient was kept under observation and liver given in the diet. As this was easily tolerated, it was possible to observe the effect.

After liver.	Red cells.	Hæmoglobin percentage.	White cell.	Colour-index.
14 days ..	3,210,000	43	8,200	0·7
21 ,, ..	3,560,000	45	6,800	0·6
28 ,, ..	3,860,000	45	10,200	0·6
35 ,, ..	3,500,000	46	8,400	0·6
42 ,, ..	3,470,000	48	8,200	0·7
3 months..	4,380,000	42	10,000	0·5

While the red cells showed a definite increase, the hæmoglobin value remained stationary over this period. The subsequent history was the usual rapid downhill course, somewhat relieved by a gastro-enterostomy. Throughout the time of observation the stools contained occult blood, and it is somewhat remarkable that in spite of the persistent bleeding the red cells increased in number over a limited time, and that this increase was accompanied by definite improvement in the general appearance. This case again responded to a certain extent to liver therapy, and had, in common with the other, an achlorhydria and a rapidly emptying stomach.

Case 3.—A woman, aged 49, complained of sickness after food for three months, loss of appetite, and extreme shortness of breath. She had observed that her stools had been pale in colour and bulky. A lemon-tint of the skin had been commented on by her friends. She had lost weight and had for the last three months suffered from abdominal pain, made worse by the ingestion of food. Examination showed a definitely yellow colour, dyspnœa, and much anæmia. The subcutaneous fat was well retained and no œdema was obvious. The tongue was dry and glazed, with atrophy of the papillæ. Abdominal examination disclosed a large, hard mass in the lower abdomen, and a smaller one in the epigastrium. Gastric analysis showed a complete achlorhydria. A barium meal showed no gastric lesion. The urine contained 100 units of diastase, and bile-pigments were present; the icterus index of the blood was 25, and the van den Bergh reaction indirect. The stools contained excess of total fats, and the reaction for occult blood was negative. A definite diagnosis was not possible, but a tentative diagnosis of carcinoma of the pancreas was made, and as no surgical interference was contemplated, the patient was kept under observation.

The blood examination showed: red cells, 1,300,000; hæmoglobin, 26 per cent.; white cells, 7200; colour-index, 1·0. Four days after commencing liver therapy the patient became so dyspnœic and distressed that a blood transfusion had to be given. Œdema of the face and hands appeared, and the patient seemed to be in a critical state. Vomiting was so frequent and persistent that it was quite uncertain how much liver extract was absorbed. However, 13 days after commencing liver therapy the blood figures were: red cells, 1,550,000; hæmoglobin, 20 per cent.; white cells, 6000; colour-index, 0·7. Nucleated reds and some megalocytes were present, and one megaloblast was seen. Poikilocytosis and polychromatophilia were very obvious.

After liver.	Red cells.	Hæmoglobin percentage.	White cells.	Colour-index.
3 weeks ..	2,040,000	34	—	0·8
4 ,, ..	2,800,000	48	7000	0·9
5 ,, ..	3,670,000	60	6400	0·84
7 ,, ..	3,700,000	60	4600	0·8
8 ,, ..	4,300,000	62	6000	0·82

At this time, eight weeks after the institution of liver therapy, the patient looked well, there was no dyspnœa, and no obvious anæmia. The digestive disturbances were as before, and the abdominal masses were palpable. In this case no occult blood was found in the stools, and no evidence of a bleeding-point was found at any time. The diagnosis of cancer has not been verified, but what is known is that this patient, like Cases 1 and 2, had an anæmia associated with an achlorhydria, showing evidence of a malignant condition of the abdomen, and that this anæmia showed a rapid improvement on a diet of liver extract. The blood films, although showing a superficial resemblance to pernicious anæmia, did not resemble the primary type, nor did the red cells and the hæmoglobin proportion. However, the lemon tint of the skin, the atrophic tongue, the achlorhydria, and the rapid response to liver extract, suggest that it was an anæmia in some ways analogous to that of pernicious anæmia.

Case 4.—A man, aged 56, was seen only nine days before death. He had always enjoyed good health, and

had complained of weakness and shortness of breath for only six weeks. For two weeks before he sought advice he had suffered with pain in the left side of the abdomen. Diarrhœa had been present for one week and anorexia for six weeks. He had never vomited. He was extremely pale with an icteroid tint, very emaciated, and dyspnœic. The distended abdomen contrasted markedly with the wasting of the rest of the body, and a hard mass was palpable in the epigastrium. No œdema was present, and no organic nerve signs were elicited. A gastric analysis showed complete achlorhydria, and a resting juice foul in smell with a total acid value of 34. A diagnosis of carcinoma of the stomach was made. Examination of the blood showed: red cells, 1,300,000; hæmoglobin, 30 per cent.; white cells, 12,000; colour-index, 1·15. The red cells were well stained and varied in size; numerous megalocytes were present, and one or two megaloblasts were noted. Poikilocytosis and polychromatophilia and an eosinophilia of 4 per cent. were present. Liver extract was given. One week later the blood count was: red cells, 1,340,000; hæmoglobin, 30 per cent.; white cells, 11,000; colour-index, 1·2. The patient did not improve but became more dyspnœic, and died in nine days. Post-mortem examination showed a hard growth of the pylorus extending along the lesser curvature and the posterior wall of the stomach. Secondary deposits were present in the liver, but no bony deposits were found. The bone-marrow was red throughout, and showed an erythroblastic reaction resembling that seen in pernicious anæmia. The death of the patient prevented observation on the effect of liver therapy, but here again the achlorhydria was associated with profound anæmia which, in this case, apart from the leucocytosis, was indistinguishable from that seen in pernicious anæmia.

Case 5.—A man, aged 57, had suffered from anæmia for four years with indefinite anorexia for six months and showed signs of wasting and of œdema. He had no vomiting or bleeding. There was a marked lemon-tint of the skin with pallor of mucous membranes. Œdema of the feet, abdominal wall, hands, and elbows was present. A fractional gastric analysis showed a resting juice with a high total acid value, of bad odour and large in volume with complete achlorhydria. Occult blood was present in the fæces. With such an advanced state no interference was contemplated, the patient being too ill even to be radiographed. The blood examination showed: red cells, 1,900,000; hæmoglobin, 17 per cent.; white cells, 7400; colour-index, 0·4. Anisocytosis and poikilocytosis were marked in the blood film, but no nucleated forms were observed. Liver extract was given, and 14 days later the following figures were noted: red cells, 2,100,000; hæmoglobin, 16 per cent.; colour-index, 0·4. The patient unfortunately died quite suddenly four days afterwards, and 18 days after the commencement of liver therapy. Whether a response would have been forthcoming had the patient lived remains undecided. Post-mortem examination showed a large, hard growth at the pylorus, with a softer extension along the posterior wall of the stomach, secondary deposits in the lymphatic glands, and an erythroblastic reaction in the bone-marrow. No secondaries in the bone-marrow were discovered. This case of carcinoma ventriculi, therefore, showed an achlorhydria associated with a marked anæmia in which the gastric symptoms were in abeyance, but in which the response to liver therapy remains problematic.

Comments.

In pernicious anæmia the constancy of achlorhydria is one of the most valuable diagnostic features. While Faber[8] and Hurst[9] have always held the view that the achlorhydria, or rather achylia gastrica, is the essential basis for the development of this anæmia, definite direct proof of this has been lacking until the recent work of Castle,[10] who has shown that an equally good response to that obtained by liver therapy can be secured in cases of pernicious anæmia if they are given beef that has been predigested with normal human gastric juice. By experiments of exclusion he has shown that it is not the hydrochloric acid nor the pepsin (at least commercial pepsin is inactive) in the gastric juice that is the active principle, but some other unknown factor present in healthy gastric juice. This substance, according to Castle's view, presumably present in normal gastric juice only, is able, by its action on beef muscle, to produce some agent which is capable of acting as efficiently as liver in bringing about a remission in pernicious anæmia; and he believes this to be the factor which, in some unknown way, prevents the development of pernicious anæmia in normal persons. This work is of profound interest for, if it is confirmed, it will make the relationship of achylia and pernicious anæmia one of more than diagnostic importance. It will become of ætiological significance. It will also bring into line the anæmias that have been observed following gastrectomy and those observed in carcinoma of the stomach. The ready response to liver in these, as distinct from other secondary anæmias, supports the conception that there is a relationship between these anæmias and pernicious anæmia, and, in addition, that the development of pernicious anæmia is the sequel to a defective gastric secretion.

If pernicious anæmia is so closely related to gastric secretion, and if its advent is dependent upon achylia, it may be asked why a primary anæmia is not more frequently seen in cancer and gastrectomy cases. The reason may be the difference in time; pernicious anæmia is an insidious disease and achylia has been noted in some cases many years before the development of any anæmia, while in cancer it is rare for the patient to be alive for more than two years after the symptoms of anæmia have become obvious. Again, investigations on cases of gastrectomy have shown that some gastric secretion always takes place, even if there is no free hydrochloric acid, a sufficient amount of gastric mucosa being left to produce some secretion. For this reason the underlying secretory disturbances can hardly be regarded as identical in pernicious anæmia and gastrectomy. The five cases given in this paper showed an achlorhydria associated with an anæmia, and three responded to liver therapy. Their ready response to liver brings them into line with pernicious anæmia, and emphasises the common factor—a deranged gastric secretion. The two cases that died showed a bone-marrow similar to that seen in pernicious anæmia, thus still further emphasising the similarity.

From a study of the literature and the foregoing cases the response of certain types of anæmia of gastric origin to liver therapy seems to be comparable to that of the primary anæmia. Two conclusions naturally follow from this: first, improvement through liver therapy in cases of anæmia associated with achlorhydria is not diagnostic of pernicious anæmia: secondly, liver therapy may prove of therapeutic value in gastric conditions, in pre- and post-operative periods, in which there is an anæmia associated with an achlorhydria, although the blood count be not of the pernicious or primary type.

The writer wishes to record his thanks to Prof. A. M. Kennedy and Dr. G. E. Beaumont for their kind permission to investigate some of the cases herein recorded, and to Dr. Lionel Whitby for helpful advice and criticism.

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A NEWCASTLE WAITING LIST.—In support of their appeal for £150,000 for enlargement, the Governors of the Royal Victoria Infirmary, Newcastle-on-Tyne, state that the waiting list contains nearly 3000 names, and that the Infirmary has "become, without exception, the most overcrowded hospital in Great Britain." Almost every week close upon 100 additional beds have to be placed between others in the wards to admit accidents and urgent cases. Whereas in 1906 the in-patients were 4899, in 1929 they numbered 14,460. In the same period the out-patients have grown from 50,000 to 355,000, and operations from 4000 to well over 12,000.

ANÆSTHESIA FOR THORACOPLASTY IN PULMONARY TUBERCULOSIS.*

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From the anæsthetic standpoint, thoracoplasty and similar operations on the tuberculous subject differ a good deal from operations performed on the patient with a normal respiratory mechanism. I propose to give briefly my observations in some 300 anæsthetics for this type of operation alone.

Condition of the Patient.—Operation is only decided upon when medical measures have failed to arrest the disease. The patient has therefore had toxæmia for a considerable period from tubercle and its attendant secondary infection. The vital capacity is below normal and the blood pressure frequently low. There is often physical exhaustion from the ever-recurring effort to cough up accumulations of sputum. It is apparent, therefore, that recovery from any operation undertaken to aid in arresting the disease should not be hampered by the effects of the anæsthetic. At the same time, it must be remembered that such operations are not in the nature of emergencies. The patient has been under the care of the physician, who has made every effort to secure the best possible physical condition before operation. Vital capacity and blood pressure readings are taken, and before the patient comes to the theatre he is placed for a time in the position which enables him best to clear his lungs of sputum.

Requirements of the Operation.—The surgeon requires the patient in the lateral position, the healthier side of the chest being supported by an air-cushion. This position is not an easy one in which to keep a mask air-tight on the patient's face or in which to control the air-way. There is a tendency also for the movements of the lower side of the chest to be impeded, although the position of the air-cushion in the axilla allows a certain amount of free expansion at the pulmonary base. The operation involves the exposure of a wide bleeding surface in a patient whose resistance to shock and hæmorrhage is strictly limited. Muscular relaxation is not absolutely essential, however, and deep anæsthesia is therefore unnecessary. The time required for operation is short, the average being 25 minutes.

Choice of Anæsthetic.

Having considered the condition of the patient and the nature of the operation, it is apparent that the anæsthetic must fulfil certain requirements, which may be classified as follows: (1) Recovery should be rapid in order that any accumulation of sputum be actively expelled immediately after the operation. (2) For the same reason the cough reflex should be present during the progress of the operation. (3) There should be no irritation or damage to the patient's lungs, either immediate or remote. (4) The anæsthetic should not cause post-operative acidosis. It is obvious that ether and chloroform should be omitted if it is possible to use less toxic agents. There remain at the disposal of the anæsthetist local analgesia, on the one hand, and general anæsthesia with nitrous oxide and oxygen, or ethylene, on the other; or a combination of the two. I shall briefly consider the merits and disadvantages of each.

Local Analgesia.—The advantages are: (1) It causes no irritation or damage to the lungs. (2) It causes no post-operative vomiting or acidosis. (3) There is definitely less bleeding during the operation. The disadvantages are: (1) The length of time required for extensive infiltration. (2) The possibility of immediate toxic symptoms following the injection of considerable quantities of novocain. (3) A slightly greater tendency towards delayed healing and sepsis of the wound. (4) The undesirability of extensive rib resections in a conscious patient, from whom it is difficult to conceal this essential part of the operation.

General Anæsthesia with Nitrous Oxide and Oxygen.—The advantages here are: (1) An unconscious patient. (2) The attention of the surgeon being undivided the operation is consequently of shorter duration. (3) Recovery is rapid. (4) There are no toxic effects. The disadvantages are: (1) The necessity of a preliminary narcotic. (2) The difficulty of administering nitrous oxide and oxygen with a mask to a patient in the lateral position. (3) A certain degree of sub-oxygenation is necessary sometimes to obtain anæsthesia. (4) There is more hæmorrhage than with local analgesia.

Discussion.

It is obvious that each of the anæsthetics mentioned has certain factors to commend it. I am aware that local analgesia is the routine for thoracoplasty in many continental clinics, and to some extent in this country, but think it should be employed only when the operation is a minor one involving the resection of one or two ribs. There may be special instances in which local analgesia is preferable—for example, in a patient of suitable temperament or where a general anæsthetic is definitely contra-indicated—but I am convinced that there is less liability to shock when thoracoplasty is performed on the fully unconscious patient. As a rule a general anæsthetic is demanded by the patients themselves.

In referring to the disadvantages of general anæsthesia with nitrous oxide and oxygen, I have mentioned the necessity of a preliminary narcotic. It is well known, of course, that satisfactory anæsthesia with nitrous oxide and oxygen can only be obtained with the aid of efficient preliminary medication. Some physicians hold that the administration of a drug which may act as a respiratory depressant and sedative is undesirable for a patient secreting a large amount of sputum. In theory this may be correct, but cough being one of the troublesome symptoms from which these patients suffer, it may be assumed that most of them have tried every available remedy to alleviate it. This may account for the fact that, in my experience of these cases, I find they tolerate morphia well. It is my custom to give an adult omnopon gr. 1/3, and scopolamine gr. 1/150, and I have observed no ill-effects from this injection. While dealing with this point, I might mention that paraldehyde or avertin per rectum are contra-indicated in cases of this type, because it is essential that the patient should clear his lungs of sputum as soon as possible after the operation.

The difficulty of maintaining a mask in position on the patient's face can be overcome to a great extent with the aid of a rubber contrivance such as that devised by Dr. R. J. Clausen for the purpose. This difficulty, and with it the complete control of the patient's airway, could be easily dealt with by employing endotracheal anæsthesia, but I am of opinion that this method is contra-indicated in thoracoplasty. Intubation requires a deeper initial anæsthesia and a deeper maintenance level to keep the cough reflex in abeyance, while the tube is in the trachea, than is desirable in these operations. Deeper maintenance level also means the addition of ether or chloroform if an undesirable degree of cyanosis is to be avoided. This militates against a quick recovery, which, as I have already pointed out, is essential in these cases. With regard to sub-oxygenation in connexion with nitrous oxide and oxygen, I feel sure of the antagonism of physicians to its occurrence in any degree. Deliberate sub-oxygenation in the presence of a free air-way, however, is a very different matter from cyanosis due to respiratory obstruction, and it is on the latter that most fears are founded. The fact remains that the degree of sub-oxygenation produced is not dangerous and has no after-effects, as far as can be ascertained.

* A paper read before the Tuberculosis Association on Jan. 17th.

Anæsthesia can be maintained with 10 per cent. to 20 per cent. oxygen in most cases.

The relative increase in hæmorrhage in general anæsthesia as compared with local is counterbalanced by the increased coagulability of the blood. Hæmorrhage is easly controlled and there is no tendency to recurrence.

Conclusions.

At the Brompton Hospital, where most of my experience has been gained while working with Mr. Tudor Edwards, we have found that the best results are obtained with nitrous oxide and oxygen anæsthesia combined with block of the intercostal nerves as soon as the ribs are exposed. The injection by the surgeon of 1 c.cm. of 1 per cent. novocain in the region of each nerve takes but a few seconds and the total quantity injected is small. It has been observed that there is less liability to shock when the ribs are divided after nerve-block than when the injection is omitted.

We have kept anæsthetic records of all cases, and the results with this combined method have given cause for satisfaction. Of 101 thoracoplasties, representing 202 operations performed by Mr. Tudor Edwards on tuberculous patients, the operative mortality has been five, all occurring in the first three weeks after operation. One patient died on the third day from pulmonary embolism; one died on the sixth day from acute spread of the disease on the opposite side; one on the twentieth day from tuberculous pneumonia in the opposite lung; one on the eighth day after the second stage from syncope; and the last from tuberculous pneumonia on the fourth day.

We preserve an open mind upon the matter of anæsthesia, however, and I have used ethylene instead of nitrous oxide with a view to obtaining better results. So far, I have not found ethylene to be vastly superior to nitrous oxide. It is true that anæsthesia can be maintained with a greater percentage of oxygen when using ethylene—an undoubted advantage. But the objectionable smell of the gas and its explosive qualities have deterred us from further experiment.

Clinical and Laboratory Notes.

PURPURA AS A SOLE SIGN IN A CASE OF MENINGOCOCCAL SEPTICÆMIA,

WITH NOTES OF ITS INCIDENCE OTHERWISE.

BY J. A. G. BURTON, M.B., F.R.C.S. EDIN., D.P.H.,
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AND
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RESIDENT ASSISTANT PHYSICIAN, ROYAL INFIRMARY, GLASGOW.

THE patient, a tram-driver aged 30, was at work as usual on April 12th, 1929, and seemed in his usual health.

On April 13th he went to work without making any complaint, but an hour later—viz., 8.30 A.M.—he returned home, as he felt sick and shivery. Shortly afterwards he vomited some black material and passed a black motion. In the afternoon he noticed that a rash had appeared upon his body. The sickness continued and he complained of coldness and pains in the legs and feet. A doctor was consulted and at once sent him into hospital, where he arrived at 1·30 A.M. on the 14th.

On admission he was found to be a well-built man. He was quite clear mentally, but very collapsed. The skin was clammy and covered with a deep purpuric rash, which affected the whole surface, head, trunk, and limbs, and was most marked on the back. The hæmorrhages varied in size from a pin-point to a blotch as large as half a crown. The skin surface was dusky and the lips were deeply cyanosed. No urine was obtainable. His temperature was 102·5° F., the respirations were regular, shallow, and frequent, and his pulse, which numbered 120 beats a minute, was very small and soft. He was very thirsty, and shortly after admission vomited a small quantity of blood, both fresh and altered. The pupils were small and equal, and responded to light. There was no retraction or stiffness of the neck, and Kernig's sign was negative.

He did not respond to treatment; the cyanosis increased and fresh petechiæ made their appearance, the pulse failed, and he died at 2·45 A.M.—less than 19 hours after the onset of his illness.

Post-mortem Examination.—There was a diffuse hæmorrhagic rash over the whole body, including the conjunctivæ. A few subpleural ecchymoses were scattered over the lungs, and subendocardial purpuric spots were present in all the chambers of the heart. The stomach and intestine showed some submucosal hæmorrhages. The meninges were congested, but no excess of cerebro-spinal fluid was found, nor was it unduly turbid. A lumbar puncture was done before the cord was exposed. On examination of this a few Gram-negative diplococci were found. On sectioning the brain nothing of note was found apart from superficial congestion.

This case is interesting on account of the fulminant nature of the symptoms and the predominance of the hæmorrhages. It is, of course, well known that in meningococcal infections death may ensue within a short period of the initial symptoms. Herrick [1] states that "death may occur within four to twenty-four hours of onset." Foster and Gaskell [2] quote the type of case where a man had gone to bed apparently in his usual health and was found dead in his bed in the morning; Worster-Drought and Kennedy [3] give an instance where a man was quite well all day and became ill in the evening; in the morning he was delirious and died half an hour after admission to hospital. These cases, however, are unusual.

The name "spotted fever" denotes the frequency with which hæmorrhagic eruptions occur in this disease, but hæmatemesis and melæna are rarely met with and hæmaturia is also uncommon. The following list shows the relative frequency of the causes of hæmorrhagic eruptions as met with in medical wards. During the last twenty years 73 cases in which a purpuric rash was a prominent feature were admitted into the unit. The clinical diagnosis in these patients was as follows: 32 cases might be grouped as septicæmia (bacterial endocarditis 27, cerebro-spinal fever 2, erysipelas, pyæmia, sepsis following burns, 1 each); 7 were leukæmias; 2 pernicious anæmia; 1 scurvy; 1 hæmophilia; 1 acute nephritis; 2 were associated with arterio-sclerotic disease, 1 with debility, and 1 with trauma. The remaining 25 cases were examples of "purpura," 9 of which died in the wards. In five of these nine cases post-mortem examinations were conducted and revealed no further cause of death. (No platelet counts were done.)

A Classification of Purpura.

In consideration of the foregoing cases the following classification of purpura was compiled from various sources. The condition may be defined as "spontaneous hæmorrhages into the skin, mucous membranes, and organs; with or without hæmorrhage into the mucous canals." Beware of flea-bites!

Group 1. (*a*) Purpura hæmorrhagica: the blood platelets are deficient; (*b*) purpura simplex: ? cause. (*c*) purpura rheumatica: purpura abdominalis: anaphylactoid purpura, possibly an intoxication due to histamine-like substances.

Group 2. *Secondary Purpuras* may be due to (*a*) chemical poisons—e.g., potassium iodide, mercury, arsphenamine, benzol, and snake poison; (*b*) infections: subacute bacterial endocarditis, cerebro-spinal fever, small-pox, and scarlet fever; the hæmorrhagic forms of the exanthemata, black measles, malignant scarlet fever, hæmorrhagic diphtheria, and hæmorrhagic small-pox; (*c*) cachexias, severe anæmias, and leukæmias; (*d*) mechanical causes: convulsions, whooping-cough, and senility; (*e*) nervous lesions: tabes dorsalis.

Group 3. *Scurvy.*—Due to the absence of water-soluble "C" vitamins.

Group 4. *Hæmophilia.*—The coagulation of the blood is delayed, due to a delay in the formation of the thrombin (hæmorrhagic disease of the new-born).

Group 5. *Fibrinopenia.*—Due to a complete lack of fibrinogen.

Our thanks are due to Dr. John M. Cowan, Royal Infirmary, Glasgow, for his advice and supply of clinical material and records.

References.

1. Herrick, W.: Arch. Int. Med., 1918, xxi., 541.
2. Foster, M., and Gaskell, J. F.: Cerebro-spinal Fever, Cambridge, 1916, p. 41.
3. Worster-Drought, C., and Kennedy, A. M.: Cerebro-spinal Fever, 1919, p. 138.

SUBLINGUAL DERMOIDS.

By Richard Warren, M.D., M.Ch. Oxf., F.R.C.S. Eng.,
surgeon to the Weston-super-mare hospital;
and
N. Carwardine Cooper, M.R.C.S. Eng.,
assistant surgeon to the hospital.

There is still some uncertainty about the origin of sublingual dermoid cysts, and, according to Colp,[1] they may belong to one of two groups. The first he considers not to be true dermoids, as they do not contain the appendages of true skin. The second group includes the true dermoids, and may originate

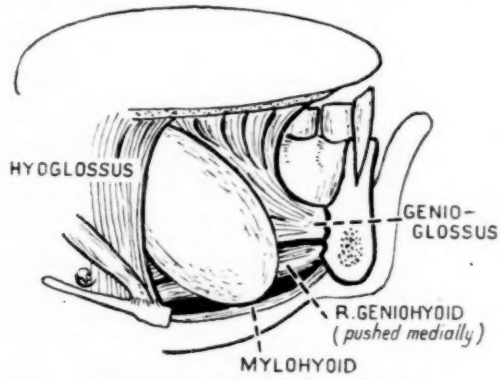


Diagram showing position of the cyst.

either (1) as epithelial "rests" from the tuberculum impar, or (2) from the union of the first and second branchial arches. Colp states definitely that the median thyroid Anlage (tractus thyroglossus) "can never give rise to true dermoid tumours."

These true dermoids have been divided by Barker, Streickheisen, Marchant, Debonnelle, Lannelonge, and others into various sub-varieties, chiefly median and lateral. The latter lie between the latero-inferior aspect of the tongue and the mandibular ramus, above the mylohyoid muscle. The median variety are more truly sublingual in position. Median cysts may be further subdivided according to whether they are above or below the geniohyoid muscle. These cysts are probably present congenitally, but become more pronounced in early adult life when the epithelial tissues—hair, sweat, and sebaceous glands—become more definitely active. Some authorities consider the increase in size to be due to a low-grade infection, but Colp finds the contents to be uniformly sterile. Clinically they may either encroach into the floor of the mouth, where they must be distinguished from ranulæ or angiomata, or they may bulge as painless swellings in the submental region, where a further differentiation from lipoma is necessary.

[1] Colp, R.: Surg., Gyn., and Obst., 1925, xl., 183.

They are sufficiently uncommon, judging from the literature on the subject, to warrant the publication of this case.

A boy of 17 complained of a swelling in the floor of the mouth and below the chin; it was inconvenient but caused no great difficulty in swallowing. Some months before a surgeon had made an attempt to deal with the condition

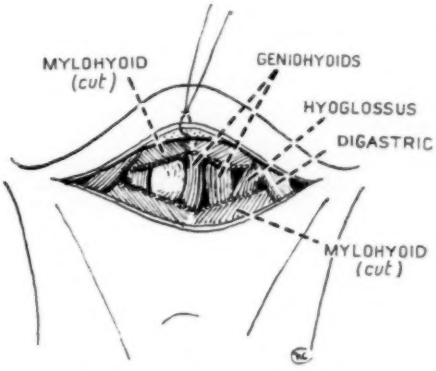


Diagram of dissection. The cyst is seen between the severed portions of the mylohyoid muscle.

through the mouth but without success. On examination there was a soft median swelling below the chin, and inside the mouth there was a smooth, fluctuating swelling below the tongue, which was pushed back. The two swellings were evidently continuous. The swelling in the mouth was median and faintly yellow in colour, suggesting a dermoid cyst seen through the mucosa of the sublingual region.

A transverse incision was made midway between the chin and the hyoid bone; the right digastric was retracted and the mylohyoid divided transversely. The right geniohyoid muscle was then pulled forward and the yellow cyst exposed, covered by the thinned and spread-out fibres of the geniohyoglossus. These last were dissected off readily, and the cyst, which extended up and far back into the tongue, removed intact. The mylohyoid was sutured and the wound closed with a temporary drain; it was well healed in a week.

The cyst was ovoid in shape and about 2½ by 2 in. in size. The wall was thin and lined with epithelium, and the cyst contained the usual porridge-like, acid-smelling material found in dermoids, but without any hairs.

MULTIPLE CARCINOMATA OF SKIN IN A CHIMNEY SWEEP.

By W. Donald Bedford, M.B. Leeds,
resident surgical officer, hertford county hospital.

A patient, aged 45, attended the Hertford County Hospital in June, 1929, complaining of an ulcerated swelling of the lower lip (outer quadrant). He had been a chimney sweep for 20 years and had had the tumour on his lip for three months; it had discharged and occasionally bled when scratched. The tumour had an indurated edge and a central ulcer which bled easily when the scab was removed; there were no palpable glands. A V-shaped excision was done, and the lip healed normally (pathological report: epithelioma). He was sent to the Radium Institute, London, where radium was applied over the submaxillary region.

The patient reappeared at the hospital at the beginning of November, and he now complained of a similar tumour on the left side of the scrotum; it had been preceded by an eczematous condition of the skin of the scrotum of varying severity for some months. On examination the tumour presented an extraordinary similarity to the original tumour on the lip, both in colour and appearance. There were no palpable glands in either groin. The tumour was excised and pathological report showed it to be a

growth of the same type as the one previously excised.

I have to thank Mr. Harold Medlock, senior surgeon to the hospital, for allowing me to publish this case, which was under his care.

Medical Societies.

MEDICAL SOCIETY FOR THE STUDY OF VENEREAL DISEASES.

AT a meeting of this Society in London on Jan. 31st, with Dr. FRANCIS J. COUTTS, the President, in the chair, Lieut.-Colonel E. T. BURKE (Manchester) read a paper on the

TREATMENT OF WASSERMANN-FAST SYPHILIS.

He said that in considering the problem of Wassermann-fast patients it must be taken for granted (1) that the diagnosis of syphilis was correct; and (2) that the patient had received treatment of such quantity, quality, and duration as experience had shown usually to have the effect of rendering the serology permanently negative. What criteria were to be adopted for each of these two things? For the present, he thought, a positive Wassermann must be taken as the criterion of diagnosis; and a persistently positive result in a treated patient as an indication of uncured syphilis. One could go further, and reason that a persistently positive serology points to the fact that the treatment given to that particular patient has in this instance been inadequate. While a persistently positive serology in a treated case undoubtedly indicated uncured syphilis, a negative serology in such cases did not necessarily imply that the disease had been eradicated. Warthin's experience (see THE LANCET, 1929, ii., 556) seemed to show that the attainment of a negative W.R. seldom meant that the patient was cured. It was necessary to look well beyond the permanent negative, and find an answer to the question of how far beyond that must treatment be pushed in order to sterilise the patient's tissues. It seemed clear that the answer must be provided by the histologist and not by the serologist.

Colonel Burke emphasised the need for "checking up" autopsy findings in treated syphilitics against the treatment given during life. He believed that with proper handling cases of early syphilis, at least, could be cured not only clinically and serologically, but also histologically; in other words, that the human body could be completely sterilised so far as the *Treponema pallidum* is concerned. That was the ultimate objective of treatment, but for practical purposes at the moment it was necessary to rely upon the Wassermann test. The very least that should be aimed at was to render our cases permanently negative. Unless the postulate was accepted that a positive Wassermann meant syphilis requiring treatment, then the discussion could not even begin. Two classes of case came within their purview: firstly, there was the syphilitic whose serological reaction immediately after treatment was negative, but after a variable interval again became positive (Wassermann-relapse). Secondly, there was the syphilitic whose serum at no period ever receded into a negative (Wassermann-fastness).

The various opinions on treatment might be grouped into two schools: (1) that which, using arsenobenzol compounds and bismuth (or mercury) administers these concurrently; and (2) that which, using the same remedial agents, administers them in alternating series. Col. Burke belonged to the latter school. He had distributed among those present the schemes of treatment adopted in his clinic for (1) early, (2) late syphilis. Among cases of early syphilis treated according to these schemes, there had not yet occurred a case of Wassermann-fastness. In his view if chemical stimuli were applied too strongly, too often, or over too long a period, the reacting tissue might become exhausted. He was therefore in agreement with those who hold that the administration of arsenobenzol alone is essentially wrong. He agreed that the patient must be treated with bismuth as well; but he did *not* agree that the two agents should be given at the same time. By the properly spaced out alternating method, no chance was given to the tissues to become exhausted, and no chance to the treponemata to develop an immunity to the toxalbumin.

Colonel Burke proceeded to consider the matter of treatment, not only of the Wassermann-fastness, but of the Wassermann-fast patient. The first principle to be adopted was to change the mode of attack. And an essential preliminary to that was to rest the tissues. Three months' rest was not time lost; it was essentially a saving both of time and of material. During this rest period the patient should be carefully examined in order to discover the location of the main damage. The result of this examination might be such as to contra-indicate any further antispecific treatment; for example if a serious cardiovascular lesion was present. It might well be that in an elderly man the fibrosis which exists in his aorta may be the only rampart between him and death. The breaking-down of this by iodides might actually precipitate his decease. Such lesions might contra-indicate intravenous medication with arsenobenzol compounds; and so if these compounds were to be given, they must be of the type of sulfarsenol and the route must be intramuscular or subcutaneous. The discovery of the principal site of the disease might call for the exhibition of bismuth alone. The age and circumstances of the patient may be such that treatment is not required—that the patient would not live long enough to enable cure or reduction in the strength of the serological reaction to take place. In any case treatment should be controlled by serological tests which showed fairly fine gradations of the strength of the reaction. In every case of syphilis the exhibition of iodides was called for, except in late and grave cases of cardiovascular involvement. In Colonel Burke's view it was practically useless to give potassium iodide in doses of less than 90 grains a day. Iodides alone had no curative value—they were merely to be used as solvents of fibrous tissue, and to open up the way for the action of arsenicals and bismuth. In his experience the Turkish bath had a distinct value in such cases. There seemed to be at least two factors at work—stimulation of the skin and pyrotherapy. Non-specific protein therapy had a practical bearing upon the treatment of Wassermann-fastness, and should invariably be carried out. The time selected for this should be during the rest-period, before the resumption of truly antispecific treatment. The preparations which he used in his clinic were aolan—a sterile milk protein given intramuscularly—and dmelcos, which was a vaccine prepared from Ducrey's bacillus and given intravenously. The effect of aolan might be provocative.

Colonel Burke summarised his views as follows: (1) Wassermann-fast syphilis is most easily prevented by combined therapy with arsenic and bismuth administered in alternating series over a sufficient period. (2) Under this system, previously untreated cases of early syphilis will be serologically cured in a period varying from 24 to 40 weeks, according to the stage of the disease. (3) Wassermann-fastness implies the presence of living treponemata and structural visceral damage of a progressively fibrotic character. (4) The condition springs from exhaustion of the patient's tissues and the development of resistance by the treponemata. (5) Treatment begins with prevention—avoidance of tissue exhaustion and drug resistance. (6) The actual handling of the established condition implies: rest and rejuvenation of the tissues: elimination of previous storage depots; dissolution of treponemal fibrous-tissue defences; stimulation of natural immunity processes by injection of non-specific protein, and by general tonic treatment: and finally when antispecific treatment is recommenced

agents should be adopted which have not previously been used, and they ought to be applied in alternating series.

Treatment and Subsequent Neuro-syphilis.

Colonel L. W. HARRISON referred to Colonel Burke's opinion that concurrent administration of arsenobenzol and bismuth or mercury led to Wassermann-fastness. A much more important question was whether the alternating courses of these remedies in early cases led to more neuro-syphilis. Colonel Harrison felt strongly that they did. It had been stated that the modern treatment of syphilis led to more and earlier neuro-syphilis, and an inquiry had been made to discover if many of the survivors of the 100,000 soldiers treated for syphilis during the late war had been seen later at neurological or venereal clinics, in pensions hospitals, or in certain mental hospitals suffering from neuro-syphilis. No evidence had been gained in support of the idea that neuro-syphilis had increased under modern methods of treating syphilis, for only six cases had been found. But there was no smoke without some fire, and he had been trying to discover how the treatment given to syphilitic soldiers during the war differed from that given to patients of syphilologists who maintained that modern treatment increased neuro-syphilis. He thought the difference lay in the fact that the soldiers were treated on the concurrent plan. Alurralde and Sepich [1] were strongly of opinion that neuro-syphilis had increased in Brazil, and attributed it to the common practice of using arsenobenzol compounds exclusively. Weatherby,[2] in a paper on the previous treatment of 280 patients who had developed neuro-syphilis, found that of the five whose treatment had begun in the primary stage all but one had received arsenobenzol alone, while the single exception had had arsenobenzol with only three doses of mercury. Out of nine treated in the secondary stage, four had had arsenobenzol only and one mercury only. Bernard [3] had tested the cerebro-spinal fluid of 200 patients and related the findings to previous treatment. The fluid had been pathological in 75 out of 89 treated with arsenobenzol only; in 14 out of 34 treated with alternating courses of arsenobenzol and mercury; and in only 3 out of 42 cases treated with arsenobenzol and mercury concurrently. In the analysis of cases treated at St. Thomas's Hospital, which the Medical Research Council had published, he had contrasted the experience in respect of clinically manifest neuro-recurrence in the cases which had been treated there with that of Moore and Kemp who treated rather more intensively but on the alternating plan.

Colonel Harrison thought it reasonable to suppose that, when an early case was treated first with arsenobenzol, the spirochæte tended to settle in the nervous system and got a start of eight weeks in doing so before the mercury or bismuth, with its perhaps more penetrating and certainly more persistent action, was introduced. Colonel Burke had blamed the concurrent method for Wassermann-fastness, but in the speaker's experience the most intractable cases from this point of view had been patients who had received little or no treatment for a number of years. He thought that probably Wassermann-fastness depended mostly on inaccessibility of the parasites, and he believed strongly in the free use of iodides in these cases.

The Intractable Wassermann Reaction.

Dr. T. ANWYL-DAVIES spoke of the influence of sodium thiosulphate on the Wassermann reaction. It had been stated in America that in 10 out of 28 cases whose Wassermann was persistently positive, the reaction became negative after administering that drug.

Dr. GEORGE RIDDOCH thought that any explanations put forward for a persistently positive Wassermann must be, in the present state of knowledge, largely theoretical. The view which he favoured was that it was due to the spirochæte being hidden in situations which were inaccessible to the general blood stream. And there was a small group of cases of tabes in which, in spite of a persistently negative Wassermann, the patient went steadily down hill. There seemed to be no evidence in support of the idea of the development of spirochætal immunity to various remedies, not even clinical evidence. Nor was he able to say whether the use of arsenical preparations led to the more frequent development of neuro-syphilis. There was need, he thought, for a tightening up of the experimental criteria in favour of one view in contrast to others. He had used pyrotherapy for cases of Wassermann-fast tabes, with varying results. In a proportion of cases of G.P.I., the Wassermann reaction of both blood and cerebro-spinal fluid became negative after a latent period, and if the patient died of some other disease, healed lesions might be found.

Mr. F. FOWLER WARD agreed that it was possible to give patients too much arsenobenzol. He used N.A.B. and bismuth. If a man, despite a positive Wassermann reaction, seemed to be in good health, why run the risk of making him worse by giving more arsenical injections? A positive Wassermann should not be regarded as a justification for perpetual interference.

Dr. A. SHARP said that if a patient had had syphilis ten years ago and his Wassermann was still positive, it was very unlikely that it would ever become negative, whatever was done. To emphasise to the patient the idea that his Wassermann being positive was important tended to produce a phobia about the disease.

Dr. H. M. HANSCHELL said the discussion seemed to show that it did not matter which method was adopted in cases of early syphilis, so long as enough treatment was given. His difficulty in many cases was that he saw them several times, but not again. He was able to say, from his experience, that a concurrent method of treatment did not produce inveterate Wassermann-positive cases. It seemed that the organism of syphilis localised itself in certain parts of the body, where it proved impervious to treatment. If it seemed that a patient's condition could not be altered, it was wise to leave him alone. He had found that the chronic Wassermann-positive cases were those who had acquired syphilis some years before and had never had treatment for it at all, or at best had only had one or two injections of arsenobenzol.

Dr. H. C. SEMON remarked that if, as was stated, arsenobenzol was excreted within two days of its injection, there must be four days, in these early stages, in which nothing was happening, and in which therefore the spirochæte, as it was unmolested, could get into the central nervous system. This encouraged concurrent administration, with the arsenobenzol of a substance which was not so quickly excreted—namely, bismuth.

Dr. MARGARET RORKE said that in her work amongst women she saw comparatively few early cases of syphilis. She agreed with Colonel Burke that it was a good thing to administer different preparations of drugs. Otherwise there was bound, later on, to be a Wassermann-fast stage. Sometimes a prolonged positive case would become negative after an interregnum in the treatment, which presumably had given the general resistance of the patient time to rise.

The PRESIDENT agreed on the importance of remembering the part played by the tissues in producing a substance which stopped the evil effects of the spirochæte. Using a variety of remedies might cause a continuance of the stimulus which brought this about. The patient must be sufficiently nourished to enable his tissues to respond to these stimuli. He asked whether the practitioner was necessarily on sound lines in feeling that the end of all antisyphilitic treatment was the production of a negative Wassermann reaction.

Colonel BURKE replied.

[1] Bull. Office Int. d'Hyg. Pub., 1928, xx., 1951.
[2] Amer. Jour. Syph., 1929, xiii., 339.
[3] Brux. Méd., 1928, viii., 1602.

Reviews and Notices of Books.

Pathology of the Eye.

By Jonas S. Friedenwald, A.M., M.D., Associate in Pathological Ophthalmology at the Johns Hopkins University, and Pathologist of the Wilmer Ophthalmological Institute. London: Henry Kimpton. 1930. Pp. 346. 21*s*.

The merit of this work is twofold. The text, being founded on a course of lectures, is in a form that appeals to advanced students of ophthalmology with a minimum of reference to the elements of the subject. Space is thus left for a sound presentation of the various pathological problems presented by the eye, especially in their relation to the problems of general pathology. In addition, there are over 250 excellently clear illustrations in black and white, taken from the pathological collections of the Wilmer Ophthalmological Institute and the Army Medical Museum. These illustrations in themselves constitute a very valuable collection, which even those who possess the larger works on ocular pathology of Sir John Parsons or S. Mayou and Treacher Collins will find useful. As is natural, the most interesting portions of the text are on those subjects to which the author has himself contributed original work. These include observations on subacute panophthalmitis, a term by which, in his opinion, many cases of cyclitis, iritis, and choroiditis arising from septic foci within the eye might properly be known. With regard to the connexion between these cases and septic foci outside the eye, as in the teeth, tonsils, and intestines, his attitude is sceptical. For every organism that comes to the eye, he says, there must be thousands, perhaps millions, that are stopped in the lungs. If the organisms are pathogenic, why do they not produce pneumonia, and if they are not pathogenic why do they cause so much damage to the eye? He proceeds to criticise the theories that have been held to account for this. While not denying the influence of septic foci outside the eye, he evidently considers that the explanation is applied far too promiscuously.

The examination of the eyes of stillborn syphilitic infants has shown in certain cases a diffuse infiltration of the choroid and sometimes of the retina and optic nerve, with wandering cells. In infants that survive, this leads to a widespread interstitial scarring. In some of them the pigment cells are stimulated to migrate into the retina, and these are the cases which in later life are liable to be confused with retinitis pigmentosa.

The author's researches in connexion with glaucoma have led him to disagree with the theory recently propounded by Duke-Elder and others that there is no constant circulation of the intra-ocular fluid, but merely an osmotic interchange between it and the blood, and to support the alternative theory that the aqueous is mainly the product of secretion from the glands of the ciliary body. To oppose the newer theory may appear reactionary, but due weight should certainly be given to Dr. Friedenwald's thesis. In the chapter on senile changes and arterio-sclerosis the author makes an important observation—namely, that in normal eyes the walls of retinal arteries and veins are fused together at the points where these vessels cross one another within a common sheath. Hence the phenomenon of arterio-venous compression so often observed with the ophthalmoscope is due not to increased blood pressure within the artery, but to an actual encroachment of the thickened arterial and venous walls upon the limited space within the enclosing sheath.

It would be easy to continue quoting examples of the interesting matter contained in this book.

Practice of Medicine.

A Text-book of the Practice of Medicine. By Various Authors. Third edition. Edited by Frederick W. Price, M.D., F.R.S. Edin., Consulting Physician to the Royal Northern Hospital; Physician to the National Hospital for Diseases of the Heart, London. London: Humphrey Milford, Oxford University Press. 1929. Pp. 1871. 36*s*.

The third edition of this text-book has been revised and brought thoroughly up to date. Some alterations in classification and general arrangement have been made. It is of interest that the article on rickets, which in the last edition was moved from the section on deficiency diseases to that on metabolism, has now returned to its former position. The changes of view and the new discoveries which have occurred during the last three years are noted and described, and this has necessitated much additional material. New articles added include those on lead tetra-ethyl poisoning, carbon monoxide poisoning, basal metabolism, vitamins, megacolon in adults, familial icterus gravis neonatorum, the veronal habit, syphilitic affections of the aorta, heart, and pericardium, and various forms of cardiac irregularity. Much fresh matter in connexion with advances in treatment has also been included. The prophylaxis of syphilis by arsenical preparations, the use of malaria in the treatment of syphilis, the use of plasmochin and plasmoquin in the treatment of malaria, the use of adrenalin, ephedrine, and barium in heart-block, the treatment of ringworm with thallium acetate, and the treatment of diabetes mellitus are a few of the sections which have been added or enlarged. Four further illustrations have been included. The form of the book is unchanged, the print is good, and the index full.

The editor has succeeded in condensing into one volume a remarkable amount of information, and has, moreover, produced a very readable book.

A History of Science.

Its Relations with Philosophy and Religion. By W. Cecil Dampier Dampier-Whetham, M.A., F.R.S. London: Cambridge University Press. 1929. Pp. 514. 18*s*.

The object of the author of this book is to tell the general story of science, and to present a broad outline of the development of scientific thought, rather than a detailed study of any particular period. After an introductory review, the rest of the book is divided into 10 chapters, of which the first three deal with science in the ancient world, in the Middle Ages, and at the Renaissance period. The Newtonian epoch has a chapter to itself, and so have Nineteenth Century physics and biology respectively. The remaining chapters deal with Nineteenth Century science and philosophic thought, recent developments in biology and anthropology, and the new era in physics; a final chapter is devoted to scientific philosophy and its outlook. To produce a book of such wide scope is a very difficult task—a task that could be undertaken with success only by a man of much general culture, with a well-balanced outlook and a sense of historic perspective as well as an intimate general knowledge of science and of the stages of its development. Dr. Whetham possesses all these qualities and something more besides, for the exposition is excellent and the story equally clear and fascinating, whether we are reading of the contributions to science of Aristotle, or those of Sir Ernest Rutherford.

Considerable space is given to the biological sciences, a section of special interest to medical readers. The story here is developed with sympathy and understanding, and while the advances made by individuals are noted with care, the author keeps his eye all the time on work going on in other branches of science. It is this perspective that makes his book

especially valuable. Historians of science too often show a bias in favour of one branch in which they are themselves chiefly interested.

Dr. Whetham has a keen sense of the limitations of physical science which he expresses in his introduction, the last few lines of which may be quoted in full, since they convey well the philosophic outlook of the author. He concludes: "Physical science represents one analytical aspect of reality: it draws a chart which, as experience shows, enables us to predict and sometimes to control the workings of Nature. But the clear insight into the meaning of physical science which is given by modern scientific philosophy shows that by its inherent nature and fundamental definitions it is but an abstraction, and that with all its great and ever-growing power, it can never represent the whole of existence. Science may transcend its own natural sphere and usefully criticise some other modes of contemporary thought and some of the dogmas in which theologians have expressed their beliefs. But to see life steadily and see it whole we need not only science, but ethics, art, and philosophy; we need the apprehension of a sacred mystery, the sense of communion with a Divine Power, that constitute the ultimate basis of religion."

TISSUE CULTURE.

Praktikum der Züchtung von Warmblutgewebe. By Dr. FRITZ DEMUTH. Berlin. Munich: Rudolph Müller and Steinicke. 1929. Pp. 116. M.6.

Dr. Demuth has attempted to produce a simple text-book for those unacquainted with sterile culturing work, rather than a manual for tissue culturists seeking to further their knowledge in the art. He aims at enabling the beginner to master the technique of growing tissue both on coverslips and in flasks, giving descriptions of all the processes involved and illustrating them with some excellent photographs. He lays due emphasis on the difficulties of avoiding bacterial contamination throughout, and on the need for absolute chemical cleanliness. His illustrations of cultures which are faulty in one way or another, because of bad manipulation or incorrect treatment, will be welcomed, but we could have wished for more descriptions and illustrations of cultures under healthy conditions showing good growth. Those unversed in tissue culture will find that the cell growing in cultural media has habits and appearances very different from those of tissue in its normal surroundings in the body; and it is with the appearance of cells, both normal and malignant, in equilibrium with their artificial cultural media, that the worker must become acquainted before he can make any application of the method of tissue culture to the solution of biological problems. Dr. Demuth in his introduction expresses his conviction that tissue culture will open a new door to the domains of biology and medicine, but it must be regarded only as a method and not as a science in itself.

THE CHEMICAL ASPECTS OF IMMUNITY.

Second edition. By H. GIDEON WELLS, Ph.D., M.D., Professor of Pathology, University of Chicago; Director of Medical Research, The Otho S. A. Sprague Memorial Institute. New York: The Chemical Catalog Company, Inc. 1929. Pp. 286. $6.00.

THIS is the second edition of a book which first appeared in 1924. It was reviewed shortly after publication and we then regretted the inclusion of so much literature that the author's critical faculty was left little play. As a work of reference on the chemical aspects of immunity the book has great value, but as a guide to a beginner in this field it lacks coherence. In the second edition the author has considerably enlarged the work, and has included all the recent papers on this vast subject. This has increased the number of opinions recorded; many of them are contradictory, with the result that a general reader must have the greatest difficulty in arriving at the current views on this subject. For example, he would gather, quite incorrectly, from this book, that the Abderhalden reaction is one of extreme importance in immunity, and the same applies to the Meiontadmis reaction. The index is full and accurate, but a separate index of authors would have been appreciated.

Prof. Wells has here provided an elaborate summary of nearly all the papers published on the chemical aspects of immunity. If, in future editions, he would add comments and opinions of his own, the ordinary reader who is perhaps not familiar with the relative merits of the various quoted workers would find the book of considerably more use than it is at present.

GROWTH AND TROPIC MOVEMENTS OF PLANTS.

By J. C. BOSE, F.R.S. London: Longmans, Green and Co. 1929. Pp. 447. With 228 figures. 21*s*.

Sir Chunder Bose here publishes another instalment of the results of his devoted labours to investigate the excitability and responses of plants, especially in their analogies with the behaviour of animals. He here describes the effects which he has observed by his extremely delicate recording apparatus of heat, light, gravity, wireless waves, and so on, on the motor responses and growth, and a chapter is devoted to the mechanism of the twining stem. As usual, the author makes no references to the work of other botanists, nor does he relate his own results to what is commonly believed; it is therefore difficult for anyone who is not an expert botanical physiologist to evaluate what he has done. But much of the book is interesting and more of it curious.

PRACTICAL BIOCHEMISTRY.

By A. T. CAMERON, M.A., D.Sc. Edin., F.I.C., F.R.C.S., Professor of Biochemistry, Faculty of Medicine, University of Manitoba; Biochemist, Winnipeg General Hospital; and FRANK D. WHITE, A.R.T.C., Ph.D. Edin., F.I.C., Assistant Professor of Biochemistry at the University. London: J. and A. Churchill. 1930. Pp. 222. 8*s*. 6*d*.

ALL teachers of biochemistry have their own individual ideas about a practical course, and eventually they nearly all publish a book on the subject. Whilst such a book may be extremely valuable to students working under its author, it does not necessarily follow that it will prove of equal value to the world in general, since it is difficult for anyone to write impersonally on such a subject as a practical course of any branch of science. An author is always apt to emphasise the points that seem to him to be the most important, and his book is more than likely to invite criticism from people who do not agree with the emphasis. Dr. Cameron is primarily a pure chemist, and thus is inclined to regard the chemical work as being the most important part of the course. We find here excellent descriptions of the tests for the elements and the tests for the organic compounds, proteins, fats, carbohydrates, amino-acids, and so forth. The book could only be followed by a student with the help of a series of lectures given at the same time, since the text contains hardly any explanations of the various manipulations and no theoretical descriptions.

The first part of the book deals with the qualitative, and the second with the quantitative and clinical procedures. A good and clear account is given of those tests on blood, urine, and foodstuffs which the authors consider to be the most useful for medical students. They have excluded more complex procedures, such as the electrometric determination of the hydrogen-ion concentration, and also all matter of purely scientific interest which is not essential for the rather circumscribed course of biochemistry which has to be crowded into the medical curriculum. The

easier tests, such as the determination of urine constituents, are first described, and after these the analysis of the blood and gastric contents and the determination of basal metabolic rate, so that by the end of the course the student has had experience of nearly all the experiments which are performed on the routine specimens reaching a biochemical laboratory.

The book is much longer and more thorough than those used in most of the English medical schools, particularly the London ones, and the adoption of a course of this kind would be of great educational value.

CARE OF THE SKIN AND HAIR.

Revised edition. By WILLIAM ALLEN PUSEY, M.D., Professor of Dermatology (Emeritus), University of Illinois. London: D. Appleton and Co. 1929. Pp. 182. 5*s*.

IN this little manual one of America's most famous dermatologists has brought together all that the layman and his feminine dependents need to know for the study and care of their complexions. The discouragement of useless fads is the prime object of the book, and it is certain that if all those who contribute towards the 300 millions which, according to another American writer, are spent annually on cosmetics in that country, were to read and mark its contents, there would be a sensible reduction of this gross extravagance. The exposition of the subject is concise—at times epigrammatic. "The only practical way to feed the skin is through the stomach" should explode the most popular of the beauty specialists' many slogans, and every physician will agree that "moles of all things should be left alone by the inexpert."

Three useful diagrams illustrate the microscopic structure of the skin described in the first chapter. The following chapter explains the normal cutaneous functions, and the next two are devoted to the care of the general health in relation to these. Water and bathing, soaps, powders, creams, and physical methods are discussed in an easily comprehensible way in the succeeding sections, and Chapters 8, 9, and 10 contain an elementary consideration of the simpler inflammatory disturbances and common defects of the skin. The final two chapters deal with baldness and other defects of hair growth. The author's theories in explanation of the former can be summarised by attributing it to a "transitional stage in man's evolution." Man no longer uses his hair for protective purposes: he wears a hat, but he cannot save what hair remains by discarding his headgear. It is too late for that. "We are a result of our ancestors, and to save our hair we would have to discard the hats of all our ancestors for scores of generations back." This pessimistic view is unfortunately supported by Jackson and White's statistics, which demonstrate that baldness is hereditary in 30 to 40 per cent. of the cases.

HUMAN CONSTITUTION.

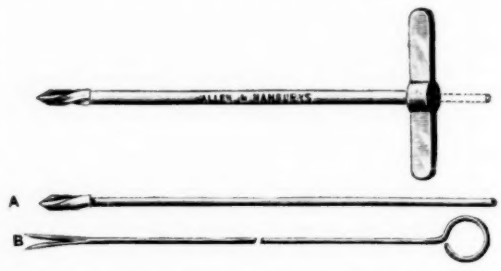
Disease and the Man. By GEORGE DRAPER, M.D. London: Kegan Paul, Trench, Trübner and Co., Ltd. 1930. Pp. 270. 12*s*. 6*d*.

Dr. Draper is spreading his activities too widely. He showed us some time ago that susceptibility to various diseases could be inferred from measurements of the body; that objective anthropometry could identify the constitutions which were particularly liable to develop pernicious anæmia, gastric ulcer, gall-bladder disease, or tuberculosis. In this way he opened up again the old and neglected field of man's constitution as an important factor in preventive medicine. We hoped that he would extend his inquiries along these lines and that other institutions than the New York Presbyterian Hospital would take up the measuring of their patients on the large scale necessary for the confirmation of Dr. Draper's first results. Unfortunately, he has widened the scope of his inquiry, and the present volume is a loosely written collection of chapters dealing largely with a rather nebulous psychology. We wish he had stuck to the dull routine of the callipers and scale; he would have been more convincing and at least as interesting.

New Inventions.

NEW PATELLA DRILL.

THICK rope silk is a very efficient and reliable material for the suture of a fractured patella, but it is not easy to apply the silk with ordinary instruments. To facilitate this operation I have had an instrument made which renders the procedure com-



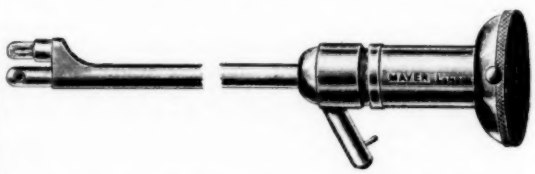
paratively simple. The instrument here illustrated consists of a drill and cannula, the feature of which is that the drill is a little larger than the cannula, and so goes through the bone easily, taking the cannula with it. The upper fragment is drilled just above the fracture and the drill (A) pulled out, leaving the cannula in situ. The silk is then pushed through the cannula with the forked probe (B). The lower fragment is then drilled, the drill removed, and the silk pushed through the cannula in the reverse direction, the two ends being tied together. The instrument can be used with the ordinary mechanical drill fitted with a chuck, and works very satisfactorily.

Messrs. Allen and Hanburys, Ltd., Wigmore-street, London, W., are the manufacturers.

HERBERT J. PATERSON, M.Chir. Camb., F.R.C.S. Eng.

AN IMPROVED PHARYNGOSCOPE.

THE instrument here illustrated is a modification of Hay's pharyngoscope. It is very much smaller and consequently better borne by a sensitive patient and is especially useful in examining children. The



lens being placed at the extreme end of the instrument gives a most excellent view of the post-nasal space and of the larynx. With the light switched on, the pharyngoscope should be introduced into the mouth, pressing lightly on the tongue to get under the arch of the soft palate; the patient should be told to close his mouth and breathe through the nose so as to bring the soft palate forward.

Messrs. Mayer and Phelps, 59–61, New Cavendish-street, London, W., are the makers of the instrument.

E. E. BURNIER, M.D. Lausanne, M.R.C.S. Eng.

THE LANCET.

LONDON: SATURDAY, FEBRUARY 8, 1930.

THE TEACHING OF MIDWIFERY.

EACH generation finds it difficult to appreciate the outlook of its predecessors, immediate or remote, and it is peculiarly hard for us to see any excuse for the neglect of the teaching of midwifery, which extends almost into our own time. In his Lloyd Roberts Memorial Lecture, delivered last November, and now reprinted with additions,[1] Dr. COMYNS BERKELEY has made a serious indictment of the General Medical Council, the examining bodies, the universities and other teaching schools for this neglect of midwifery. He shows how little the obstetric teachers of an earlier generation, even with the help of the Obstetrical Society of London and of other professional organisations, were able to carry with them the existing powers that in their efforts to secure proper clinical training and an obligatory qualifying examination in a subject that bulks so largely in the work of the family practitioner. The mere fact that midwifery had no place at all in the medical curriculum before the Medical Act of 1886 is startling when it is realised that the date is recent enough to allow some of those in practice to-day to have qualified before it came into force. Doubtless the apprenticeship to a general practitioner, a custom with much to be said in its favour, helped to fill up the gaps in the curriculum, but curious anomalies of that time still exist. The General Medical Council has rarely had more than one obstetric teacher among its 40 members, even since training and examination in midwifery was made compulsory and took its place alongside medicine and surgery in the student's curriculum. The Committee of Management of the conjoint examinations of the Colleges has never included a representative of midwifery, although that subject has formed the third division of the final examination for over 40 years. The wonder is that a College of Obstetrics did not arise years ago, instead of but the other day.

The difficulties in providing adequate clinical training in midwifery are considerable, both from the side of the teachers and the medical schools; as Dr. BERKELEY points out, the task of convincing their medical and surgical colleagues of their need for more beds and a larger share of the student's time, if he is to be properly equipped for the work of general practice, has hitherto been beyond the power of the obstetricians. The shortage of beds is reflected in the loose way in which candidates are signed up for the examination; the certificates of the training schools are irregular to a degree considered by Dr. BERKELEY almost to [illegible] them into the category of forgeries. The figures obtained from the various teaching hospitals (given in an appendix to the paper) show that in London, for instance, the number of cases allotted to medical students averages 14·5, and in some cases 12·7, instead of the minimal statutory 20. In ten London hospitals with medical schools there was a deficiency of 3628 cases for the students they trained, whereas the pupil midwives trained in London had an excess of 7856 cases over the number necessary to provide the 20 demanded by the Central Midwives Board, and but a fraction of these women will practise midwifery. The absurdity of the medical practitioner obtaining less clinical training than the midwife to whose assistance he must go in cases of difficulty is too obvious to call for comment. Dr. BERKELEY would increase to 30 the number of cases in which the medical student personally attends delivery, and he would like the General Medical Council to stiffen the required certificates by demanding a type of schedule similar to that adopted by the Central Midwives Board, which includes spaces for the name of the patient, her address, and the date of her delivery, so that it is possible to check the allocation of cases. To facilitate this he would make the poor-law hospitals the chief training ground for midwives and ask the London County Council, for instance, to set aside one of its hospitals of 400–500 beds for their training—and incidentally for a centre of pathological and biochemical research. It is here that Dr. BERKELEY's scheme differs fundamentally from that of Mr. DONALD ROY, who contributes his reflections to the last issue of the *British Medical Journal* (p. 212). If the medical practitioner and the midwife are to work harmoniously together—and it is in this coöperation that he sees hope of improvement in the maternity service—their training should instil into them the wish to coöperate. Should it be accepted, as he believes, that the good and true tradition of conservative midwifery is to be found at its best in the lying-in hospitals of London and other large centres, progress lies not in excluding the pupil midwife because her keenness filches away from the medical student the bulk of the cases, but in extending the clinical material at these hospitals, if necessary by attaching poor-law beds, and letting the pupil midwife act as monthly nurse for the medical student's cases during the period in her training when she is not herself taking cases. The medical student would then see the midwife's rôle clearly defined. While learning to appreciate and trust the midwife, he would also learn when, where, and how to take over control of a case himself.

The problem of fitting an adequate clinical training in obstetrics into the medical curriculum is one of time as well as of place and personnel. Dr. BERKELEY has come to regard six years as its minimum duration, a period now prescribed by most of the great medical teaching centres in the world and even exceeded by some, the longest being nine years in Sweden. In such a programme infant welfare and hygiene are regarded as part of postnatal supervision and complementary to midwifery; the recommendations of our General Medical Council to this effect have remained until now a dead letter. The important place of pædiatrics in the work of the family practitioner also necessitates additional clinical provision for it in the curriculum. Six months at least would be devoted solely to obstetrics and gynæcology, of which four should be allotted to midwifery with its ancillary services of prenatal and postnatal supervision and infant welfare, and two to gynæcology—the common minor ailments rather than the details of operative technique. Of this time two months, preferably more, should be spent in residence at a lying-in hospital or maternity department with at least 50 beds. To these and the many other constructive suggestions made by the Lloyd Roberts lecturer all interested in medical education should pay heed.

[1] Manchester: Sherratt and Hughes. Reprinted for private Circulation from the Journal of Obstetrics and Gynæcology of the British Empire, 1929, xxxvi., 701.

ACUTE OTITIS MEDIA.

ACUTE inflammation of the middle-ear cavity, common enough at all times, is especially prevalent at this time of year, and it is therefore appropriate to pass in brief review the salient features of this important affection. In the overwhelming majority of cases the infecting organisms gain access to the middle-ear cleft from the nasopharynx along the Eustachian tube. The inflammation is not confined to the cavity of the tympanum, but involves the whole of the tract of the middle ear; for the Eustachian tube itself, the tympanum, the antrum, and the mastoid cells are all implicated.

The infection may be caused by a great variety of organisms, but in any individual case it is usually due to one variety only—that is, an organism is obtained in pure culture from the middle ear. When perforation of the membrana tympani has taken place, secondary infection with the organisms present in the meatus can readily occur; this is believed to be the principal cause of failure of resolution and consequent chronicity, and its prevention is one of the important aims of treatment. In some epidemics of the acute specific fevers, notably scarlet fever, measles, and influenza, the infection is of extraordinary virulence, and rapidly involves the bony walls of the cavities, and produces by extension the well-known and dreaded intracranial complications. But in the great majority of cases the virulence is far less severe, the bone is not seriously affected, and the inflammation is almost confined to the mucous lining of the aural cavities. As the entire cleft of the middle ear is involved in the inflammation, it follows that in any case of acute otitis with earache, tenderness is likely to be present over the mastoid, either over the antrum or the mastoid tip, or in both situations; but at this stage such tenderness does not imply that surgical opening of the mastoid cavity is indicated. The key to the cure of inflammation of these cavities, as of most other inflammatory diseases, is free and unobstructed drainage. In the earliest stage the fluid secreted can drain down the Eustachian tube, and many cases of mild inflammation of the middle ear do drain and get well in this way. But in severer cases the tube is obstructed by swelling of its mucous lining, perforation of the membrana tympani occurs, and drainage by this route with subsequent healing results. Sometimes, again, there may be a block at the aditus, or at the neck of a mastoid cell, or group of cells, with the result that the mastoid becomes surgically involved.

These facts should form the basis of the treatment of all inflammations of the middle ear. In the mildest forms, with little or no pain, but with a feeling of fullness and some impairment of hearing, gentle inflation with the Eustachian catheter will often re-establish the patency of the tube and hasten recovery. When earache is present the prompt use of an antiseptic in the meatus is of value to sterilise the canal and prevent secondary infection should the membrane perforate or have to be incised; a 5 per cent. solution of phenol in glycerin is frequently employed and has the additional advantage of acting as a local sedative. But when pain is severe and accompanied by fever, a timely incision of the drum membrane is the best of all therapeutic measures, and in a very large proportion of cases is speedily followed by cessation of the earache and recovery from the inflammation; there is no need to wait for bulging of the drum. This little operation is not difficult to perform, and is much more often postponed too long than done too soon, but a general anæsthetic should be given, for it causes intense pain in an acutely inflamed ear. If symptoms persist for more than a few days after free drainage of the tympanum has been established, the probable cause is obstruction of drainage at the aditus or in the mastoid cells, and a mastoid operation is desirable. In a few cases a profuse discharge continues in the absence of other symptoms; if this remains without abatement over some three or four weeks, it is probably due to partial obstruction in the mastoid, and also calls for operation in order to avoid chronic suppuration.

ASPIRATION OF DIPHTHERITIC MEMBRANE.

IT is related that on one famous occasion Stalky fulfilled his threat to get even with the Head for "a lickin' from King, 500 lines, *and* a gating," and the method of his revenge was the publication of the Head's gallantry in applying the aspiration method to the diphtheritic membrane of Stettson major, a mere day boy. Certain workers in America have been attempting to perfect a routine by which aspiration technique can be applied to diphtheria in the larynx as well as in the fauces, and without the element of personal risk which provided Stalky with his triumph. The procedure, which was initiated in 1922, is associated with the name of Dr. HARDMAN, now of the Ontario State Public Health Service, and has been gradually developed. For the last four or five years it has been used regularly in several American hospitals and references to it have appeared from time to time in the Weekly Bulletin of the Health Department of the City of New York. No paper, however, has yet appeared giving full details of the technique and an adequate statistical estimation of its value. The chief medical officer of the Metropolitan Asylums Board therefore decided to draw the attention of his Board to the desirability of obtaining first-hand information on the value of the method, and Dr. ALEXANDER JOE, medical superintendent of the North-Western Hospital, was sent out to New York to investigate it on behalf of the Board. His report, which has been published,[1] was the subject of discussion at a meeting of the Fever Hospital Medical Service Group of the Society of Medical Officers of Health last week.

The aspiration method employed at the Willard Parker Hospital, New York City, was described in detail in our last week's issue (p. 257). The apparatus required is simple and inexpensive and consists of a laryngoscope; a portable suction apparatus, run off the hospital current; a number of sterile laryngeal swabs fixed to the swab-stick by collodion and held in artery forceps; a tongue depressor; and the special brass suction tubes, which can be made for a few shillings. The American authorities recommend that none of the apparatus should be plated because of the risk of roughening or scaling of the plating after much cleaning. The patient is wrapped in a sheet and held by a nurse, while another nurse steadies the head in such a way that it hangs backwards over the end of the table with the medial plane at right-angles to the table. The laryngoscope is introduced so that it rests on the upper teeth in the mid-line, bearing on the roof of the epiglottis. After a thorough inspection of the larynx a swab is passed for direct culture, and the aspirating tube is then used once or twice as required. The operation lasts a few moments only.

[1] Metropolitan Asylums Board, Infectious Hospitals Department. Report on the Aspiration Method of Treating Laryngeal Diphtheria. By Alexander Joe, M.D., D.P.H. Office of the Board: Victoria Embankment, E.C.

and—provided the operator is reasonably skilled—causes the patient no more than a little discomfort. At the Willard Parker Hospital no anæsthetic was given for its performance. It is particularly useful at the intermediate stage of membrane formation, the stage at which the patient usually enters hospital. The membrane is then readily detachable and there is little œdema and no hæmorrhage.

The statistics available are unfortunately inadequate to provide any reasonable indication of the value of this method, but it is always true that the personal impressions of good clinicians are worth more than many volumes of figures and Dr. JOE found that the physicians in New York and Boston who had followed the progress of the work were unanimously in its favour. It is no derogation of a new technique to say that the personal element enters very considerably into its success, and Dr. JOE found that the technique is not difficult and should be equally successful in the hands of anyone with the dexterity to perform a direct laryngoscopy. It seems to be safe, and the only mishap on record is the loss of a milk tooth. Although in America it has always been used as a substitute for or accessory to intubation, Dr. JOE sees no reason why it should not be equally valuable in cases where tracheotomy is the operation of choice; indeed, aspiration through the tracheotomy tube might turn an apparent failure into a success. The introduction of diphtheria antitoxin marked such a tremendous advance in the campaign against the toxic aspect of diphtheria that the obstructive aspect is apt to be forgotten by those who do not constantly have to deal with these distressing cases. The aspiration technique, if it proves as safe, simple, and inexpensive as Dr. JOE suggests, will certainly deserve most serious consideration by all who are concerned with the treatment of croup.

MENTAL PATIENTS AND THE JUSTICE'S ORDER.

IN the Mental Treatment Bill as it comes before the House of Commons no justice's order is required for temporary treatment. It is not easy for the medical profession to form an unbiased opinion on the necessity for the justice's order before the reception of mental patients in hospitals or into private care. The welfare of the patient is the doctor's first thought, and when he is satisfied that immediate treatment is necessary he chafes at the delay that the application to a justice involves, and he sympathises with the unwillingness of the friends to make the application. When this means a revision of the case he is impatient, and resents the interference of a layman in what he considers a purely medical matter. Familiar with the procedure in infectious disease he sees no reason why mental illness should not be treated in like manner. Conscious of singleness of purpose in regard to the welfare of his patient, he is convinced that the medical profession can be trusted to discharge its duty properly. On the other hand, the sacredness of liberty is so important in the minds of those with whom the freedom of the subject is a religion, that they feel that, even if treatment be delayed in some cases, even if now and then patients commit suicide when the justice declines to sign the order, and even if the procedure is painful to relatives, yet the welfare of the community justifies the present procedure. If they are told that the recent Royal Commission found no single person improperly detained, they will reply that this is because the present procedure is successful.

In a recent pamphlet[1] by Dr. J. R. LORD the whole question of the procedure for the admission of persons suffering for mental illness is discussed. Dr. LORD would discard the justice's order and in its place substitute the approval of "a panel of approved citizens," appointed by the local authority. There would be no formal order, but the approved citizens would merely endorse the medical certificate. It is doubtful whether this procedure would satisfy the liberty-of-the-subject enthusiast, whether it would be more acceptable to the relatives of patients, or whether in practice the "approved citizen" would be in any way preferable to the magistrate. But while saying this we are grateful to Dr. LORD for directing attention to a subject that deserves serious study. Everyone with experience knows that the justice's order is really little or no safeguard against improper detention. Some justices are complaisant, taking little trouble when the parties concerned are known to them; some are so oppressed with the responsibility of signing orders that grievous delay in treatment occurs; some find the duty thrust upon them by the State so unwelcome that they rely entirely on the clerk. Incidentally the refusal of a justice to recognise a case of high-grade deficiency may and does lead to the procreation of illegitimate children. The position is often most painful when a patient under care exercises his right to see a justice after his admission. A medical officer of long experience tells us he cannot recall a single case in which this did any good, unless it be called doing good to be in a position to tell the patient afterwards, "Well you had your chance and saw the justice." All this is wrong in principle; it emphasises the detention, and ignores the medical aspect of the case.

The value of the intervention of the justice should be examined afresh by a select committee or some other impartial body. It may not be remembered that Lord SHAFTESBURY, who probably more than anyone in his day contributed to the reform of our mental institution, who was responsible for the passing of the 1845 Acts (often called the Magna Charta of the insane), and who was one of the first lunacy commissioners, protested to the end against the introduction of the justice, and when overridden by the Act resigned his commission. Now nearly 40 years have elapsed and the question arises whether, after all, Lord SHAFTESBURY may not have been right. If he was it follows that the procedure which seems now to be embedded in English law is really unnecessary and is retarding the treatment of mental disease. We are glad the Ministry takes the view that a justice's order for temporary treatment would defeat its own object.

[1] Reprint from the Journal of Mental Science for Oct., 1929. London: Adlard and Son. 2*d*.

FREEMASONS HOSPITAL AND NURSING HOME.—During the past year the pressure upon accommodation was so great that the staff had to be provided for in five separate buildings. The "case days" increased from 14,772 to 15,872. Large extensions are to be made at a cost of £250,000, of which £100,000 is in hand; the land has already been paid for. There were 640 in-patients during the year, 32 of whom came from over-sea.

HOSPITALS AND MOTOR ACCIDENTS.—Motor accidents last year cost Altrincham General Hospital £1050. Many of the injuries were sufficiently serious to necessitate prolonged stays in the hospital. In the three months ending with October last the motor accident cases treated at the Royal United Hospital, Bath, numbered 21 in-patients and 26 out-patients. The in-patients remained for a total of 235 days at a cost of £94, of which £1 7*s*. 6*d*. was repaid.

Annotations.

"Ne quid nimis."

THE INTERNATIONAL CONGRESS OF MENTAL HYGIENE.

THE National Council for Mental Hygiene is acting in Great Britain as a liaison body in regard to this Congress—the first of its kind—which is being held in Washington from May 5th to May 10th. The Study Tours Sub-Committee of the Royal Medico-Psychological Association have now organised a study tour in the United States in connexion with the Congress, and prompt applications are invited from those who propose to attend the functions. A United States correspondent has already described the activities on the other side of the Atlantic (THE LANCET, Feb. 1st, p. 260), from which the intention to make the occasion an important one can be gathered. Attendance at Washington is not limited to members of particular organisations or to official delegates, but affiliation to the Congress is open to all interested in mental hygiene, while members of the Royal Medico-Psychological Association will be able to participate in the Tour projected to take place before the Congress. Those doing so will visit, as a party, representative American institutions, and obtain an opportunity of familiarising themselves with the practical as well as the scientific aspects of American psychiatry under advantageous conditions, economical and otherwise. Copies of the programme of the Congress and Tour, and forms of application, can be obtained from the Secretary of the National Council for Mental Hygiene, 78, Chandos House, Palmer-street, London, S.W. It will be a great convenience if those who wish to attend the Congress would send their names and addresses at once to Dr. J. R. Lord, Horton House, Epsom, while those who are members of the Royal Medico-Psychological Association should communicate with Dr. A. Edward Evans, 3, Rotherwick-court, Golders Green, N.W., who is acting as hon. secretary of the Study Tours Sub-Committee. Decisions to join the party should be made at once, as reservations for berths and hotel accommodation are limited. The travel arrangements are in the hands of Messrs. Thomas Cook and Son, Ltd., and intending delegates will receive every assistance by communicating with the head office of that firm, Berkeley-street, London, W.

AN UNUSUAL EPIDEMIC OF DIPHTHERIA.

THE January number of the *Journal of Hygiene* contains an instructive account of a diphtheria outbreak in New Zealand. It appears that in a certain small township the attack rate for diphtheria was, in 1926, equivalent to about 30 years of the London endemic. This high morbidity was attributed to the "unsalted" condition of the community. The cases occurred in two distinct groups, and all the circumstances suggested that the majority of the earlier set of cases contracted the disease by means of droplet infection in the local school. The later group were infected by milk, and the incidence fell chiefly on pre-school children and adults, presumably because the school age group had been partially immunised by the preceding air-borne outbreak. The epidemic afforded an opportunity of making some exceptionally interesting observations on Schick immunity and the rate of artificial immunisation. At the time of the first outbreak samples of the children were Schick tested, and those who reacted were given a course of toxin-antitoxin mixture. Owing to the inadvertent use of a deteriorated Schick toxin, many children, who would have reacted to a fully potent toxin, were falsely recorded as immune, and were not given prophylactic inoculations. When the second outbreak materialised there were two groups of children—those who had had prophylactic inoculation and those who had not—and it was noted that the incidence of diphtheria among the inoculated group was not significantly different from that of the total community. This disappointing result was, however, explained when a second series of Schick tests, six months after the first, showed that 72 per cent. of the presumably protected children had failed to acquire active immunity. The failure of the prophylactic course to induce immunity in the majority of those who received it is attributed to the lack of diphtheria experience in rural as compared to urban districts; it was found that in the orphanages of Dunedin city 100 per cent. of the Schick susceptible children acquired immunity within four months, with the same prophylactic course that failed so conspicuously in the unsalted rural district. This observation points the practical lesson that the more unseasoned a community, or the higher the original percentage of susceptible Schick reactors it contains, the more intensive must be the prophylactic course if it is to be successful in inducing active immunity against diphtheria. Because of these and other lessons this New Zealand epidemic deserves the careful consideration of epidemiologists.

A DECLARATION OF FORMULAS.

THE technicalities of the Medicine Stamp Acts and of their administration have rendered possible a new development, the implications of which are of wide interest, in the large-scale manufacture of proprietary medicines. There is reason to suppose that the first English nostrums of which we have any record were not secret remedies. Thus we find George Wilson, the chemist whose aqua mellis was supplied to James II., advertising proprietary and other remedies in 1686 with the invitation: "And at all times a Free and Welcom access to see any of those Medecines you shall have of me, prepared from the beginning to the compleating of the same." And there is in the Public Record Office a letter from Dr. John De la Bere, of Christ Church, Oxford, dated March 23, 1596/97, containing the passage: "Those Specifica medicamenta, wh were promysed to be p'pared for me, by your London Chymyst, I could never obtayne. Wherefore . . . I am forced now to bylde a Laboratorie or Stylhouse of myne owne . . . ." Secrecy was at first, not improbably, a weapon against unscrupulous competition; but secrecy had the manifest drawback of becoming, in some circumstances, indistinguishable from quackery. The first Medicine Stamp Act, passed in 1783, taxed secrecy except when secret remedies were sold by persons who had served "a regular apprenticeship to a surgeon, apothecary, druggist, or chymist." The principal Act now in force, that of 1812, does not perpetuate this comprehensive exemption, but lays on vendors the onus of showing a remedy to be "known, admitted, and approved" as the condition of sale unstamped. Reduced to its simplest terms, the relevant clause provides that such remedies shall not be the outcome of "any occult secret or art," shall not be associated with an exclusive right of manufacture, shall not be patented under the Great Seal, and shall not be held out as nostrums or as specifics. In practice, the Board of Customs and Excise, the administrative authority, requires a declaration of formula either on the label of each unstamped medicine or in an approved book of reference. The remaining obstacle, that of trade-mark rights, is surmounted by registering a trade mark for a series of articles and not for a single medicine. Such remedies can be sold unstamped by chemists (including limited companies carrying on business under Section 3 (4) of the Poisons and Pharmacy Act, 1908) and by the small class of other persons who have served a "regular" apprenticeship. Vendors not so qualified must take out a patent medicine licence. Until the last few weeks this exemption has only been used on any considerable scale in respect of medicines the composition of which was easily deducible. Now, however, manufacturers of

proprietary medicines extensively sold have begun to avail themselves of the exemption in one of the two permitted ways. The departure is of interest in that such medicines are no longer secret remedies—though a casuist might argue that they remain secret when sold stamped. As a matter of fact, it has long been the rule in various Continental countries that all imported medicines must bear a declaration of formula; and in this way analysts and other people interested have easily come to know the composition of remedies that in this country have been regarded as secret. Some years ago we printed[1] a number of formulas of British and American specialties as disclosed to the Italian customs authorities by the makers themselves. A long way has been travelled from the state of things familiar in the early years of the eighteenth century, when arcana were advertised as obtainable "at the author's house." The proprietor or part-proprietor of the modern "nationally" advertised medicine may well be a man of high education who in his heart despises secrecy and is quite willing to let the world know his formula, confident that his long experience in turning out a particular compound will ensure its predominance in a more open market. Obviously the disclosure of the formula should in every case be complete; a mere list of ingredients will not suffice. It remains to be seen to what extent the principal manufacturers of proprietary medicines will decide on disclosure, and what the effect will be on the revenue from medicine stamps, which has averaged for the past ten years about £1,300,000 annually.

UNITED STATES ARMY MEDICAL EQUIPMENT.

IF nations were consistent in their preparations for war they would observe just as much secrecy over advances in military medicine and equipment as they do over a new gun or submarine. But fortunately for our faith in humanity they do not carry these matters to their logical conclusion and any advance in the technique of treating battle casualties is published to the world at large. The Wellcome Prize for research in this field has been won for 1929 by Major J. P. Fletcher, of the United States Army Medical Corps, for his report on the Army Medical Department's Equipment Laboratory, and the work done there since the war.[2] The scope of this work has been very varied, and some 37 different articles of equipment have been considered, the most important among which were first-aid dressings; individual equipment for medical, dental, and veterinary officers, N.C.O.'s, and privates; standard medical field containers; a metal litter for airplane and trench use; types of ambulance bodies; a collapsible two-wheeled litter cart and heaters, lighting sets and laboratory equipments for field hospitals. Major Fletcher says that whenever a proposed model is considered certain factors have to be borne in mind. These are: possibility of production in quantity; availability of material in time of war; replacement of breakage; cost as compared with utility and time, weight or space saved; simplicity and "fool proofness"; applicability of the device to additional uses. After exhaustive tests by the laboratory and in the field, the model has to be passed by the Medical Department Board, and any other arms of the service which may be interested in it. Under such searching conditions, about 70 per cent. of models are rejected. As regards first-aid dressings there were five of these in use in the U.S. Army at the end of the war. These have been reduced to two; a small, which is a five by seven inch gauze-covered cotton pad attached to a four-tailed bandage, and a large, which is approximately 12 inches square, but otherwise identical. The application of wheels to a stretcher is obviously desirable, but the two-litter carrier evolved during the war for traction by men or behind an ambulance proved unsatisfactory. The laboratory have designed a two-wheeled cart which can be clamped on to any standard army litter. This cart weighs 70 pounds, and is mounted on small rubber tyred "buggy" wheels which can be folded with the wheels parallel to the axle, to be hung on the back of a vehicle. It is claimed that tests have shown that evacuation of wounded can be greatly speeded up by its use. A considerable advance has been made in ambulance design. During the war two types were found to be required, a light Ford type for front line work, and a larger type for use in convoys. The war-time three-litter Ford type has been developed into a four-litter body on a passenger car chassis, the whole ambulance so light that it can be lifted bodily by 14 men. The old four-litter heavy type mounted on a standard one-ton truck chassis has been changed to a six-litter body weighing less than the original pattern, and with the driver's seat completely enclosed in glass. This body will carry six lying cases or twelve sitting cases and one lying case, or six sitting cases and three lying cases—in other words, there is an all-round increased carrying capacity of 50 per cent.

[1] THE LANCET, 1924, i., 256.
[2] Military Surgeon, December, 1929.

HÆMATURIA CAUSED BY INHALING TURPENTINE.

A RECENT outbreak of hæmaturia on one of H.M. ships appears to have been due to inhalation of turpentine vapour by seamen engaged in painting in enclosed spaces. Surgeon-Commander H. Wilks[1] reports that symptoms arose after one or two days' work, seven men reporting themselves sick within a week. The patients complained of scalding pain at the end of micturition, and, in some cases, of frequency; the urine contained blood and had the violet odour associated with turpentine poisoning. The hæmaturia disappeared spontaneously and rapidly in hospital, and showed no signs of recurrence on return of the patients to work. The turpentine used was analysed and was reported by the Government analyst to be good and normal. To prevent further cases, the parties of seamen engaged in painting were cut down and distributed at greater distances from each other, and orders were given for removal of paint from hands and faces before eating. No more cases arose after the parties had been thinned out. There is a possibility that the turpentine used was insufficiently mixed with the flatting, for the seaman responsible for this task was hard put to it to keep pace with the demands of the painters. The vapour of the turpentine was therefore more quickly released than it was removed by the ventilation system.

THE BARGEE'S CHILD.

WHILE the slums of London continue to advertise on a large scale the effect of overcrowding on child life, it seems curious to bewail the lot of the few children living on barges. Lieut.-Colonel Fremantle, during the debate on the second reading of the Canal Boats Bill on Jan. 31st, estimated the number of these children at 3000, and said that of these only 1000 were receiving no education. Further, though the sleeping quarters on canal boats are confined, ill-ventilated, and overcrowded, and the sanitary arrangements are usually primitive, there is no evidence of a lower standard of health among barge-dwellers than among town- or country-dwellers of the same class. In point of fact, the bargee lives less in the cramped cabin than the average cottager lives in his house; it is difficult to persuade a normal child to stay indoors; it must be almost impossible to prevail on him to stay in the cabin of a barge. But while the London slum child plays in the street, the child of the barge plays in fresh air on the deck or banks. Eight hours in overcrowded sleeping quarters have thus to be set against the remainder of the day, which is spent in the

[1] Jour. Roy. Nav. Med. Serv., January, 1930, p. 53.

open air. Certainly, should the child fall ill the conditions are highly unsuitable both for nursing and for adequate medical care, and early removal to hospital is the only remedy. That the children take part in the work of the barge is not surprising; but there is no reason to assume that the bargee, who (apart from a notable but possibly mythical vocabulary) does not differ from other men, is likely to make his children wretched by overworking them. The difficulty of educating these children certainly calls for thought. A canal-boat school, as Mr. Harry Gosling explained when moving the second reading of the Bill, has all the disadvantages of a canal boat and few of the advantages of a school. The children attending would be educated among themselves with no possibility of mixing with other children, and the damp quarters, absence of playgrounds, and of sanitary arrangements make such a school most undesirable. Even so, it seems a drastic measure to try to combat these disadvantages by making it illegal for children to be on such boats. If this is done the mother will be forced to set up house on shore with the children, and family life will at once come to an end. Though it has been suggested that the absence of women from the boats would entail addition to the crews and hence increase in cost of transport, Mr. Gosling is of the opinion that reconstruction of canal boats should prevent this. He went on to describe the difficulties of childbirth on a canal boat, with inadequate preparations and in the presence of most of the family. Granted that this is extremely undesirable it occurs with great frequency in any slum district, and is not peculiar to barge life. The problem of overcrowding is fundamental, and not to be cured by removing children from barges. Canal boats used for the removal of house refuse, however, are certainly an unsuitable environment for the upbringing of children, and the public should be able to learn what proportion of canal boats are used for this purpose and whether the same boats perform this function continuously or intermittently. That children do live on such barges at present is proved by the reports of the Ministry of Health inspectors; the report of the Public Cleansing Committee also discusses the matter, and recommendations were made by the inspectors that children should not be allowed to live on refuse barges. While no medical man would fail to support such a suggestion, many will hesitate to agree to the wider application implying the de-barging of all these children.

PSITTACOSIS IN GERMANY.

FURTHER information is now available about some of the German cases of psittacosis to which our Berlin correspondent referred on Jan. 25th. Writing from Hamburg, Prof. C. Hegler[1] describes two small outbreaks, one of which involved three members of a family which traded in animals and the other some of the staff and patients of the St. Georg Hospital. The clinical picture in all the nine cases was, he says, surprisingly uniform, and included pneumonia. The bacteriological findings were negative, although a special search was made for *Bacillus psittacosis*, and Hegler thinks that the disease may be due to a filtrable virus acting, perhaps, in combination with bacilli such as pneumococci and streptococci which happen to be present. The isolation of such a virus was reported in our last issue by Bedson, Western, and Simpson. Prof. H. Embden and Prof. G. Adamy[2] describe 14 cases observed in the general hospital at Barmbeck. All the patients manifested symptoms similar to those of the English cases, and the bacteriological findings were all negative. Dr. G. Elkeles[3] contributes an account of an outbreak last November in a Berlin household, a member of which had brought back from the Upper Amazon four birds, three of which were very ill. With one exception, all those living in the house fell sick; two died and three narrowly escaped with their lives. A friend to whom one of the sick birds was given also fell ill, but the family which received the sound bird showed no signs of illness. All the patients suffered from severe cerebral symptoms and circulatory disturbance, together with an atypical form of pneumonia without sputum. In another small outbreak the infection attacked six persons who had come into contact with a parrot. Cultures from the organs of the dead patients gave no data of ætiological significance, and investigation on the dead birds also produced no result. Elkeles does not believe that *B. psittacosis* has anything to do with the disease.

[1] Deut. med. Woch., Jan. 24th, p. 148.
[2] Münch. med. Woch., Jan. 24th, p. 140.
[3] Ibid., p. 139.

THE CONTROL OF BOVINE TUBERCULOSIS.

Dr. George Hilton[1] gives a valuable account of what has been done and is being attempted in Canada to control bovine tuberculosis. The first step in 1896 was the offer of free testing of herds with tuberculin, an offer which met with little response. In 1903 an Act was passed making it compulsory to place an identification mark (a punched T) upon all reacting cattle. No opposition is recorded, a matter of interest since such action is a very debatable and controversial matter in this country. The supervised herd plan was adopted in 1905, but made little progress. In 1914 municipalities were required to limit their milk-supply to officially tested herds, a procedure which broke down in practice owing to the refusal of many dairymen to submit to the testing of their herds, while the complaisant could not provide an adequate supply of milk. This was got over by allowing untested herds to supply if the milk was pasteurised. These measures, if their actual results were small, were certainly instructive and thus enabled the Federal Department of Agriculture to introduce the accredited herd plan in 1919. Under this plan, much used in the United States, the aim is to eradicate tuberculosis in individual herds and then maintain them free from this disease. The testing and retesting of cattle is done free of charge, and compensation is paid for slaughtered reactors upon a fixed scale. On March 31st, 1929, there were approximately 4000 fully accredited herds apart from 2000 herds in process of becoming accredited. Ancillary to this, the restricted area plan was adopted in 1922. Provided at least two-thirds of the cattle owners in any specified area sign a special petition, and this is approved by the government of the province concerned, the plan is put into operation. The object of the plan is to test all herds in a defined area as expeditiously as possible, with a view to locating the infected herds, and steps are then taken to eradicate tuberculosis in these herds, compensation being paid for slaughtered reacting animals. Compensation is only given after satisfactory disinfection of the premises. Retesting is, of course, necessary, and steps are taken to prevent the introduction of infected animals. The area plan is considered the more economical, and it promotes better housing and other sanitary conditions for the cattle. When Hilton's paper was written there were eight restricted areas with approximately 700,000 cattle. In general, these two plans have made great progress and about one-ninth of all the cattle in the Dominion have been tested at least once, while over 114,000 reactors have been slaughtered. There is an increasing demand for tubercle-free cattle and milk.

It may be pointed out that the above schemes are only practicable in areas with a low incidence of bovine tuberculosis. Hilton does not give the average incidence in Canada, merely remarking that it is comparatively low, but the procedures are nearly identical with those employed in the United States where the percentage varies from only 3 to 5 per cent. In England our rather imperfect data suggest that it is not less than 40 per cent. and in many areas

[1] Jour. of Dairy Research, 1929, I., 58.

considerably more; so that these American methods are really impracticable here. Notwithstanding this fundamental difference these drastic eradication methods are not without their supporters in this country. Quite recently the West of Scotland Division of the National Veterinary Medical Association has issued a pamphlet entitled "Scheme for the Eradication of Bovine Tuberculosis," which while differing in details from the American model is, nevertheless, based on the same principles.

It is of interest to note that Dr. Hilton's article appears in the first number of a new periodical, the *Journal of Dairy Research*, which is financially supported by the Empire Marketing Board. Lord Passfield, in a foreword, states that the journal is designed to assist dairy research workers in every part of the Empire, and is planned to include in each issue three classes of material—namely, a monograph by a leading authority on some broad question of dairy research work, detailed papers of scientific interest, and reviews and records of current scientific contributions to dairy research. There is ample room for such a publication, and if later numbers are up to the standard of the first issue it should find a large and appreciative circle of readers. The editor is Dr. R. Stenhouse Williams, of Reading, whose name will be familiar to many of our readers in connexion with his work as Director of the National Institute for Research in Dairying.

TREPANS AND TREPHINES.

FEW instruments employed in surgery at the present time have a more interesting and ancient history than the trepan. Its use dates back at least 2300 years, when Hippocrates first described the various instruments employed in his time in the operation of trepanning. Even long before this period there is evidence that prehistoric man practised the operation by scraping away the bone with a piece of sharp flint or obsidian as the bushmen of Australia and the natives of New Britain and New Ireland do at the present time. In the New World the Incas of Peru, from a period of antiquity, employed a flint with a serrated edge to remove the fractured bone, as shown in many skulls that have been excavated. The ancient Greeks used three kinds of instruments for trepanning—viz., the terebra or borer, the terebra serrata or circular saw, and the perforator, which was operated with a bow drill. The first, which had a spear-shaped point, was employed when the piece of bone to be removed was larger than could be covered by the circular terebra serrata, and was operated by means of a thong twisted round the centre or attached to a cross-beam. It was used for boring holes around the piece to be removed, and when this was done the lenticular was introduced to break through the interspaces between each perforation, and the roundel of bone then removed. The terebra serrata was a conical piece of metal with a serrated edge, shaped somewhat like a thimble, with a straight shaft rising from the top, and was operated by rapidly rolling the shaft between the palms of the hands. In this instrument we have the origin of the crown saw which the Romans adopted for their modiolus. They also employed the terebra, which they operated with a bow-drill, using a terminal with a sharp point which suddenly became broader, as described by Celsus. In the twelfth century Albucasis described an instrument terminating in a spear-shaped head called "incisoria," and a borer with a sharp point, both of which were employed in his time for trepanning; while in the fourteenth century Lanfranc alludes to a borer with a spear-shaped point called a "trepanon" for making a ring of perforations. In an interesting manuscript of the same period by John Wryghtson, an English surgeon, there is a drawing of an instrument similar in shap to the Roman modiolus with a circular saw and centre-pin, fixed to a straight handle, which was evidently operated by rolling between the palms of the hands. In the fifteenth century Bruynswyke described and figured "trepanes" terminating with a long gimlet-like screw, "to make small holes in the skull." Andrea della Croce, the Italian surgeon, in his work "Chirurgie" printed in 1573 devotes considerable space to the operation of trepanning, and describes several instruments with a brace and drill-stock, to which a circular saw or perforator could be fixed with a screw as occasion required, and the same type of instrument was used and described by Ambroise Paré.

The first mechanical trepan was described by Matthia Narvatio of Antwerp in 1575; this consisted of a horizontal beam with a cog-wheel in the centre, turned with a handle, that actuated the saws or borers, which were fixed on a straight bar with a screw. To Fabricius Aquapendente (1537–1619) is attributed the invention of the trephine, though Woodall in 1639 alludes to the trephine as "an implement of my owne composing," it was figured by Fabricius before his time. According to Savigny, "The name trephine is so-called from the triangular form it acquires by the horizontal position of its handle, in contradistinction to the trepan, in which the head or crown is affixed to a frame or brace, similar to and used in the manner of the carpenter's wimble." To Fabricius is also attributed the introduction of the trepan saw with shoulders, which prevented the instrument sinking down into the membranes of the brain; although Ambroise Paré figures a brace or drill-stock with a binding screw to fix the saw, the drum of which was straight and smooth, with a shoulder of a similar kind. Paré described "trepanes" as "round saws for cutting out a circular piece of bone with a sharp-pointed nail in the centre projecting beyond the teeth." He also figures a trephine which he says, "is most in use and the fittest, set forth by Dr. Crooke." In the seventeenth century Scultetus describes a trepan operated with a drill-stock which he calls "the handle," and also mentions a trephine with a transverse handle to which circular, conical saws could be fixed.

The eighteenth century marks a new era in the history of the instrument, during which the trephine gradually replaced the trepan worked by means of a brace or wimble. In 1739 Sharp introduced his trephine with a wide transverse handle of steel, the extremities of which were roughened so that they could be used as elevators. He claimed to be the first to use a trephine with a cylindrical in place of a conical, crown saw, with a key to remove the centre pin. Heister in 1743 says, "the moderns have a method of fastening the crown on the trepan otherwise than by screwing, but this is my way." He upheld the use of the screw and the saw with a conical crown. He also describes an exfoliative trepan, the handle and saw of which were fashioned from one piece of steel. In 1779 Petit introduced his perforator with a steel drill head, smooth and bevelled for drill edges, but the head was shorter than Sharp's. The type of instrument used at the close of the century is thus described by Savigny in 1798. "It had a cylindrical saw with a smooth drum, the barrel being inserted into the handle direct. It had fine teeth without gaps, and the pin ran into a slot in the barrel regulated by a binding screw and plate." The peculiar formation of the teeth (exactly perpendicular) was claimed to be an important advantage to the operator. "At this time," remarks Savigny, "the trepan used with a brace or wimble is now wholly laid aside in this country." In 1801 Benjamin Bell introduced his trephine with a wooden cross-bar, into the middle of which was screwed a steel key-barrel with a spring grip made to grasp a slot in the key-end of the trephine saw. The chief improvement was in the saw, which had a cylindrical smooth drum, with long straight teeth arranged in three series of nine, three gaps being thus left to let out bone dust, the forerunners of the windows in modern instruments. The prismatic was controlled by a thumb or binding screw and plate, which worked in a slot on the side of the barrel. Rudtorffer introduced a further improvement in 1817, by adding a screw button in the shaft by means of

which the pin could either be raised or lowered. From that period the shape of the trephine has practically remained unaltered, although the saw has passed through many modifications. Examples of the instruments mentioned, illustrating the origin and development of the trepan and trephine from ancient times, may be seen in the Historical Section of the Museum at the Royal College of Surgeons of England, to which an excellent guide[1] has just been issued.

SPLENO-MEDULLARY LEUKÆMIA.

THE occasional association of spleno-medullary leukæmia with trauma has been noticed from time to time, and the injury has been regarded as an important ætiological feature by more than one writer. Dr. S. C. Læwsen records a new case on p. 288 of this issue and quotes a large number of other cases from literature. To these may be added one just reported by Dr. Annelise Wittgenstein.[2]

The patient, a railwayman of 42, had never been ill until one day he fell on the ground and one of his mates tripped over him. The only apparent result was a slight effusion of blood from the leg. He remained at home for a month. Soon after the injury he started to complain of pain in the foot and loss of appetite, with heavy day sweats. He suffered from general debility and lost weight. Nevertheless, he continued to work under regular medical supervision for the next four months, during which time the cause of his poor condition remained undiagnosed. He died eight months after his injury, and the blood counts made in hospital admitted no doubt of the diagnosis of myelogenous leukæmia, the only unusual feature of the case being the normal size of the spleen. The number of red cells and the hæmoglobin index were greatly reduced, the figures being 1,600,000 and 35 per cent. respectively. The leucocyte increase, as is usual in the acute condition, was moderate, the count giving only 20,000.

It proved impossible to ascertain whether the patient had substained a blow in the region of the spleen, but Wittgenstein thinks that a severe shaking, especially if combined with contusion of the abdomen and the long bones, may be enough to lead to leukæmia in predisposed persons. He thinks that the cause is to be sought in exogenous influences of toxic, mechanical, or infectious origin. The reference to "predisposed persons" seems to bring this author nearly into line with those who believe that trauma does no more than reveal a pre-existent disease. This opinion is very widely held. Prof. Salvatore Diez,[3] for instance, who lately collected 30 cases of a supposed association, came to the conclusion that they afforded no proof that leukæmia could originate from a blow.

FIRST-AID IN ELECTRICAL ACCIDENTS.

IT cannot be too widely known that electric shock hardly ever causes death outright. Dr. D. Pometta, principal medical officer of the Swiss Accident Insurance Institute, has recently given a useful résumé[4] of the various methods of treatment which will probably save the victim's life if applied promptly and patiently. Such measures should be as familiar as the first-aid treatment of the common forms of poisoning, and the practitioner living in a district where accidents of this kind are particularly likely to happen will do well to have his apparatus packed in a special case ready to take up at a moment's notice. He should put aside all other work to answer the call to an electrical accident immediately, and should be prepared to stay by the patient for several hours. As soon as the victim has been removed from the danger zone, his mouth should be freed from dirt and any other obstacle to respiration, such as artificial teeth, and clothing should be removed from the upper part of the body, preferably cut off to save time. He should be kept warm with blankets and hot-water bottles or heated bricks, but zealous assistants must be warned of the danger of causing burns. The face and chest may be splashed with water, the limbs and cardiac region may be massaged, and cardiac and respiratory stimulants such as lobeline may be given subcutaneously; but none of these secondary requirements must delay or interrupt artificial respiration—the essential treatment—for more than a few seconds. While pointing out that prompt and correct application is more important than the choice of any special form of artificial respiration, Pometta prefers the Sylvester method. Here he is in a minority, for most authorities agree with Prof. S. Jellinek[5] in recommending Schäfer's. He regards manual methods as better than mechanical, but says that apparatus may be useful to replace assistants when everyone is tired out. Carbon dioxide is a valuable respiratory stimulant, and can be given from a soda-water syphon when no cylinder is available. The syphon is half emptied and a rubber tube is attached to its nozzle; it is then inverted and the fluid is blown out of the glass tube. Gas is admitted to the patient's air passages through one nostril, while artificial respiration is maintained continuously. Unless the patient's other injuries are so severe that he cannot possibly be alive, respiration must be continued for at least five hours, and the absence of the sounds of heart or respiration or of the corneal reflex are no indication that he is dead.

Sir Thomas Legge, who retired from the position of Senior Medical Inspector of Factories in 1926, has joined the staff of the Trades Union Congress as adviser to the Social Insurance Department on the health of workers as affected by conditions arising out of their employment. His work will lie primarily in the prevention of industrial disease and disability, and he will continue by pen and word of mouth to keep the trade-union movement informed on the problems of health in industry. There is undoubtedly a still untapped source of study and research in the sickness records of the big trade-unions in this country.

INDEX TO "THE LANCET," VOL. II., 1929.

THE Index and Title-page to Vol. II., 1929, which was completed with the issue of Dec. 28th, is now ready. A copy will be sent gratis to subscribers on receipt of a postcard addressed to the Manager of THE LANCET, 7, Adam-street, Adelphi, W.C. 2. Subscribers who have not already indicated their desire to receive Indexes regularly as published should do so now.

[5] See THE LANCET, 1927, ii., 1001; 1928, ii., 314.

DONCASTER ROYAL INFIRMARY.—The report for the year ending Sept. 30th, 1929, shows that 1805 patients were admitted, who stayed for an average of 25·13 days, as compared with 23·4 days in the preceding year. New out-patients numbered 7143, an increase of 745; there were 3786 casualty cases and the attendances and treatments in the massage department were 27,416. A supply of radium to the value of £3000 has been given by Mr. William Nuttall. During the year Dr. H. J. Clarke, who has since died, celebrated his fiftieth year of general practice in Doncaster and was presented by his colleagues with a piece of plate. Dr. Clarke handed over to the hospital the balance of the Presentation Fund, amounting to £75, with the proviso that the income should be used for the purchase of a medal to be awarded annually to the best nurse of the year. The well-arranged and informative report sets out that the cost per bed was £129 8*s*. 9*d*., a reduction of 12*s*. 5*d*. The cost per in-patient was £8 16*s*. 10½*d*., and per day 7*s*. 0½*d*.; out-patients cost 9*s*. 6*d*. The first block of the new Infirmary, containing 150 beds, with accommodation for 85 nurses and maids and the usual accessories, is approaching completion. The Doncaster Collieries Association has contributed £10,000 towards the cost.

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[1] Guide to the Surgical Instruments and Objects in the Historical Series, with their History and Development. By C. J. S. Thompson, M.B.E., hon. Curator of the Historical Section of the Museum. With a foreword by the Conservator, Sir Arthur Keith, M.D., F.R.C.S., F.R.S. London: Printed for the College and sold by Taylor and Francis, Red Lion Court, Fleet-street. 1929. Pp. 92. 2*s*. 6*d*.

[2] Med. Klin., 1930, i., 22.

[3] See THE LANCET, 1927, ii., 562.

[4] Schweiz. med. Woch., 1930, iv., 82.

The Clinical Interpretation of Aids to Diagnosis.

A Series of Special Articles contributed by Invitation.

LXII.—INTERPRETATION OF REPORTS ON LESIONS OF THE EYE.

PART II.*

IN the first part of this article I dealt with definite organisms. When questions arise on the interpretation of the results of tests, such as the Wassermann reaction or Pirquet's test, the answers are less easy. The modern tendency to rely more and more on laboratory tests and less and less on clinical experience and knowledge imposes a responsibility on the bacteriologist which is unfair both to him and to the patient. It must be reiterated that laboratory tests, no matter how reliable, form only part of the data essential for correct diagnosis.

The Wassermann Reaction.

It often happens that a patient is sent to a laboratory for a Wassermann reaction. The result is positive—and without any further consideration the patient is passed on to a V.D. department, the eye condition being labelled "syphilitic." Further consideration may prove that the eye condition is due to septic teeth and the positive Wassermann to a congenital taint which requires no treatment. It is the clinician's job to elucidate these facts, not that of the person making the test. I am not suggesting that it is wrong to treat a patient with a positive reaction as a syphilitic, but only that it is wrong to label an eye disease as syphilitic on a positive Wassermann reaction alone.

Reports on Patients with Iritis.

The interpretation of the reports on investigations designed to elucidate the cause of iritis is difficult. The causes are so many and varied that it is often impossible to say with certainty what variation from the normal is responsible for the iritis. It may be accepted that iritis and iridocyclitis are, as a rule, the result of toxic irritation due to some distant septic focus. It is, indeed, rare to examine a patient without finding some septic focus, a suspicious tooth, infected sinus or antrum, a collection of pus behind a deflected septum or septic tonsils; any of them may be the cause (and equally may not be the cause) of the iritis. There is one cause of iritis in men which should always be inquired into—viz., gonorrhœa. In women gonorrhœal iritis is extremely rare. I have never seen a case. The history of gonorrhœa, however, is not enough, and in my V.D. department all the other causes of iritis are gone into before the patient is examined for evidence of an old gonorrhœal infection. Gonorrhœal iritis seldom occurs during the acute urethritis stage of the disease, and the average time after the acute attack of gonorrhœa at which the iritis appeared worked out at 9 years in one series of 250 cases, and 14 years in another series.

Significance of Pus and Gonococci—

Having assessed the importance of any other septic foci the next step is to examine the patient for evidence of a residual gonorrhœa. Urethritis and gleet are rare at this stage of the disease, and it is only when we come to the examination of the material expressed by prostatic and vesicular massage that evidence of the original infection appears. It is quite usual to find pus in considerable quantities, but is quite unusual to find the gonococcus, and although at one time I was finding the gonococcus in 9 per cent. of the cases of rheumatic iritis sent to my department for examination, my last figures worked out at 3 per cent., due to a more critical definition as to what was a gonococcus in the slides examined. Perhaps even this is too high a percentage. The difficulty of detecting the gonococcus amongst the débris of pus cells, spermatozoa, and organisms in the smear is so great that a definite statement is rarely possible. However, when pus has been found in the prostate or vesicles, treatment has to be carried out in spite of inability to find the gonococcus in the discharge, and the condition is labelled gonorrhœal iritis. The report made on a prostatic massage will often record the finding of all sorts of other organisms, streptococci, staphylococci, pneumococci, colon bacilli, and diphtheroids. These are probably the results of secondary infections and must be taken into consideration when arranging a course of treatment. This should consist of (1) the symptomatic treatment ordered by the ophthalmic surgeon, such as atropin, leeches, hot bathing, &c., (2) specific treatment, such as vaccines, prostatic and vesicular massage, irrigation, &c.; and (3) treatment to clear up other septic foci.

—and of Rheumatic Pains.

Rheumatic was at one time frequently applied to what we now know is often gonorrhœal iritis. Rheumatism is almost always present in the history of patients who come with gonorrhœal iritis. Considering the small percentage of cases in which the gonococcus is found it is naturally open to debate as to whether these cases should or should not be diagnosed as gonorrhœal iritis. I myself use this classification, because the cases of iritis in which I find pus in the material from the prostatic massage are the cases which react to gonococcal vaccine. The reaction may be one of exacerbation of the existing iritis, or one of rapid cure of the condition. I believe that gonorrhœal iritis is a toxic condition and that the gonococcus is not present in the eye. Dr. Eric Biddle, when he was working with me at Moorfields, made the observation that it was quite rare to find gonorrhœal iritis in patients who had clean mouths, or perhaps it would be better put that people with septic teeth were more likely to get gonorrhœal iritis than those with clean mouths. This may account for the comparative rarity of the condition in private practice and certainly one of the first things to do in treating these cases is to have the mouth attended to.

Tuberculin Tests.

The tests for tuberculosis of the eye are few, and of little real value as proof tests. The only one of any real value is the subcutaneous injection of tuberculin, with resulting focal, local, and general reaction, but this test is practically debarred from use in eye work, since it is inadvisable to risk stirring up a tuberculous eye by a focal reaction. The graduated Pirquet test, using human and bovine tuberculin, is of some value if the results are used with discrimination, although the test cannot give definite information like the subcutaneous test.

If the result of the test is taken into consideration with the clinical evidence it is of help in young patients, and in adults may be a useful guide as to the type of tuberculin to use in treatment. The presence of a positive Pirquet test does not mean that the eye condition is a tuberculous one.

S. H. BROWNING, M.R.C.S. Eng.,

Bacteriologist to and Lecturer on Bacteriology and Medical Officer i/c V.D. Dept. to the Royal London Ophthalmic Hospital.

* Part I. appeared last week.

HOSPITAL COÖPERATION.—As the result of a Conference of representatives of the voluntary hospitals in the County of Durham a committee of ten was appointed to join with a similar number of members of the medical staffs of those institutions to meet the Durham County Council to discuss questions of hospital service arising out of the provisions of the Local Government Act.

Special Articles.

RADIUM THERAPY.

AN ACCOUNT OF A VISIT TO THE RADIUM INSTITUTE OF PARIS.

By J. W. NANKIVELL, M.B., B.S. LOND.,
LATE ASSISTANT TO THE RADIUM COMMITTEE OF MIDDLESEX HOSPITAL.

I HAVE just concluded a six months' visit to the Radium Institute of Paris, during which period I served as *stagiare* or clinical assistant in the different departments. A few days sufficed to show me why this Institute has gained such a high international reputation for itself and its workers. Here was the opportunity to see and later assist in the treatment of patients, mostly suffering from cancer, by surgery, radium, X ray therapy, or combination of any of these methods, as appeared indicated for each case. Here were patients consulting for advice, not at the surgical, radium, or deep therapy department, but at a clinic in which each department was represented. Each patient thus received the benefit of advice, entirely unbiased, as to what was considered the best line of treatment. Having been detailed to the appropriate department, the patient now had the benefit of coming under the care of a specialist in radium therapy, X ray therapy, or surgery, as the case might be. Some cases required more than one specialist's care, the preliminary examination by each deciding the details of the conduct of the treatment. In the follow-up clinic for treated cases the presence of representatives of all three departments encourages in each an appreciation of the possibilities of the methods of his colleagues. The biased opinion which often results from ignorance of the other side of the problem thus tends to become eliminated.

My visit has convinced me of the absolute necessity for specialisation of a large number of medical men in the field of radium therapy. Without such specialisation, and as long as radium therapy is practised widely by those whose ignorance of its limitations and dangers is equalled only by their enthusiasm to wield this new-found weapon against cancer, radium is merely a menace to the safety of those sufferers to whom it is applied in an attempt to cure. The main line of advance in the treatment of cancers by radium on the continent has been by the evolution and perfection of surface therapy, which has now superseded radium-puncture and the implantation of seeds, the methods popularly used in England to-day, as being the method which most nearly gives the ideal irradiation, uniform and homogeneous, by highly selective gamma rays. The lack of large quantities of radium has long held in check the possibility of exploring widely this field of radium therapy in this country.

With the creation of the National Radium Fund, which has reached nearly £300,000 and the appointment of a Commission to deal with the purchase and distribution of radium, the time has come when the importance of this line of radium therapy must be realised to the full if radium is to be utilised to the best advantage, and, more important, if patients are to receive what is due to them, the best and most effective treatment available. Surface therapy requires an entirely different equipment to that demanded by radium-puncture. The present tendency to put up all radium into small needles of varying lengths and charge, of varying filtration, usually 0·5 Pt. wall or less, though it produces a supply of radium very well suited to radium-puncture, also renders the same supply ill-adapted to surface therapy. It therefore seems justifiable at this juncture to put forward a plea for the serious consideration of the merits of surface therapy, and the setting aside of a considerable proportion of the radium to be purchased for the country for the purpose of testing its efficacy over a reasonable period, on suitable cases, in large enough numbers to form definite conclusions as to its superiority or not over radium-puncture.

The Commission has already shown great judgment in testing out "bomb therapy" on similar lines. Bomb therapy is only a modification of surface therapy demanded by the weight of the heavy lead protection required to protect patient and personnel from the rays emitted by the large charges utilised for treating deeply seated growths. Whilst the bomb of four grammes has but limited scope, owing to its fixed size, shape, and charge, surface therapy from which it has evolved has a very wide scope. It consists essentially in the formation of small radiant surfaces, of varying size, shape, and distance from the skin or mucous membrane to which it is moulded, which can be made to produce a very uniform and homogeneous irradiation of tumours at different depths by variation of distance of application and charge of radiant surface. Prof. Regaud and his collaborator, Dr. Lacassagne, have in recent lectures here and in America given a clear account of the evolution and growth of radium therapy, the underlying principle governing its use, their ideas on such matters as radio-sensitiveness and radio-resistance. It is my intention merely to mention briefly the methods I have seen applied to three sites of cancer—namely, the tongue (including floor of mouth), the skin, and the cervix uteri. Space does not permit details, and I am avoiding the error of mentioning average doses, except in the case of the uterine application, where doses vary less than in other sites.

GENERAL PRINCIPLES OF TREATMENT.

Certain general principles are applied at the Radium Institute of Paris, whatever be the site of the lesion or the status of the patient.

1. *Selection of Cases.*

(*a*) Elimination of patients in whom distant secondary deposits in the viscera and elsewhere are suspected on clinical and special examination.

(*b*) Elimination of those whose general health is such that they would not support the severe treatment necessary for cure without grave danger to life.

(*c*) Concentration chiefly on those cancers which react most satisfactorily to radium and X rays. Such are at present the epithelial cancers of epidermic origin, arising in the skin or mucous membranes covered by stratified pavement epithelium; certain sarcomata; some cancers of the prostate and breast.

(*d*) Elimination of all cases who have been previously treated by radium or X rays by other private clinicians or at institutions, unless they bring or can produce a statement of dosage received and details of treatment.

The importance of this rule cannot be over-emphasised. A vast experience of the radiotherapy of cancers has convinced these workers of the importance of taking strict precautions against the rule being broken, save in exceptional circumstances. They believe that a cancer, once treated by radiotherapy, becomes resistant to further irradiation. At the same time the normal tissues become more sensitive to rays after a previous irradiation. Each subsequent treatment will have to be more severe in order to overcome the more resistant cancer.

A second, and, still more, a third or a fourth treatment, whilst standing a poorer chance, therefore, of curing the cancer than would have done the first treatment, becomes more and more harmful to the normal tissues. Too often, in such cases, cure of the cancer is bought at the price of an extensive necrosis of the normal tissues, the production of which is as often as not as dangerous to the patient as was the cancer itself.

2. *A Preliminary Biopsy.*

This is required in every case, and the report received before treatment is commenced. In certain

cases biopsy has to be omitted for obvious reasons, either till operation, or altogether, but these cases are exceptional. Biopsy is usually performed at the first out-patient consultation.

3. *Single Treatment.*

The belief in the gradual vaccination or onset of radio-resistance of irradiated malignant tissues to the further action of rays has led to the recognition of the necessity of giving the whole treatment within a comparatively short period before this complication has time to make itself seriously felt. A treatment which aims at being curative should, therefore, be complete within about three weeks. The single treatment does not infer that only one technique shall be utilised. One technique may follow another, but all should be complete within the stated period.

4. *Dosage.*

Although experience has taught that some varieties of cancer are more sensitive than others to irradiation, yet it is considered preferable at present to treat all cases by the biggest dose compatible with the health of normal tissues, until research has given more certain data on which dosage can be based.

The physical dose is measured in millicuries destroyed, and all radium tubes are designated according to the hourly destruction of radon which the radium content is responsible for. As none of the tubes represent an hourly destruction of more than a fraction of a millicurie, they are designated in terms of microcuries (1/1000 Mc.) destroyed per hour. The standard tubes used represent 100, 50, and 25 microcuries destroyed per hour (ucdh), or 13·3 mg., 6·6 mg., and 3·3 mg. radium element. The filtration is 1 mm. Pt.; exceptionally, in a few special tubes, 1·5 mm. Pt.

All radium-puncture is performed with radon, utilising hollow needles of 0·5 Pt. wall, 25 and 35 mm. in length, usually containing 1 Mc. per cm. active length as initial charge.

Whether radon or radium be used, the dosage is exactly comparable, both being given in terms of Mcd., an advantage lost when such terms as mg. hrs. and mc. hrs. are employed.

The biological dose which is much employed in surface therapy is the epidermicide dose—i.e., that dose which produces a selective action on the basal cells of the epidermis, producing a "chute" of the epidermis, without damage to the dermis; the approximation of the intensity of irradiation received by the deepest part of a tumour to the intensity at the skin level is aimed at in surface therapy by so increasing the distance of the source from the skin and correspondingly increasing the charge that the falling off in the intensity between the skin and the tumour is not sufficient to prevent the dose to the latter being lethal. By producing always a chute of the epidermis, one thus ensures that the malignant cells, usually considerably more sensitive than the basal cells of the skin, shall also receive a lethal dose if the distance of the radiant surface and other factors of application have been rightly estimated. It seems superfluous to add that increase of the distance of application does not increase the penetrating power of rays, as I have seen stated.

5. *The Time Factor.*

At the Radium Institute much importance is attached to this factor. Five to ten days is the usual duration of treatment employed in most of the techniques utilised for reasons which are well known. The realisation of the fact that amongst malignant cells those in a state of division are more sensitive than others, and that all do not divide simultaneously, has led to the adoption of a longer exposure to a smaller charge of radium, which has proved more effective in sterilising cancers, at least in the case of the squamous cell carcinoma, whilst being less harmful to the normal tissues.

6. *Homogeneous Irradiation.*

Improved results of radium therapy have resulted from the gradual increase of filtration, suppression of beta radiation, and even the softer gamma rays where feasible, avoidance of secondary radiation by secondary filtration, and improved methods of distributing the selective gamma rays uniformly throughout the malignant tissue.

Radium-puncture, once much in vogue, has given way to surface therapy, except in a few situations where it remains still the best method at present; such situations are the tongue, uvula, certain cancers of the breast, and deeply infiltrating skin cancers. These small needles, whose walls fail to exclude all the beta rays and soft gamma rays, with their weak charge, whose intensity of irradiation, strong immediately around the tube, falls off very rapidly away from the source, require very careful introduction into an easily accessible tumour to render success at all likely. The near presence of bone contra-indicates their use in many situations, owing to the damaging effect of primary and secondary beta caustic rays. This technique has, therefore, a limited use at the Radium Institute of Paris.

Treatment of Special Locations.

Cutaneous Epitheliomata.

The method of moulded plaques of Colombia paste of variable size and thickness is in general use for epitheliomata occurring on the skin and accessible mucous membranes, such as the inner surface of cheek and floor of mouth. The general principles remain the same in whichever part of the body the application is made.

The area to be treated, usually allowing ½–1 cm. outside the areas of clinical invasion, is marked out accurately with skin pencil, and a layer of paste, softened in warm water, applied with the firmer, woody surface next to the skin. When moulded it is dipped in cold water to set, reapplied, and the area marked on the skin projected on to the wax surface. This area is carefully measured in square centimetres. The dose required to sterilise a cancer depends on the area to be treated and the depth of infiltration. The thickness of the paste is in relation to the depth of the lesion, but the charge required to produce the *chute* of the epidermis varies not only with this, but also in relation to the total area, and the surface, whether convex or flat. These factors influence to a great degree the amount of cross-fire occurring; cross-fire increases with increase of area, increase of distance, and increase of convexity, and is minimal when the area, thickness, and convexity are small. The dose is ordered in terms of Mcd. per $cm.^2$; the total dose thus arrived at, and the number of days during which the apparatus is to be worn (4–7) being decided, the apparatus is charged with radium tubes of 1 mm. Pt. wall, of such charge that good distribution of tubes is acquired, and the number of hours a day during which it must be worn is calculated. The radiant surface so formed being covered with another layer of wax, it is strapped in position on the patient for the requisite time per diem.

Many patients whose lesions are conveniently situated can be treated as out-patients by utilising radon; such cases, usually with lesions of the forehead, face, &c., have to wear the apparatus continuously for 3–5 days and report each day for inspection. Later they report each day for dressing by vaseline gauze and inspection of the lesion until all reaction has subsided and healing complete.

The treatment of lesions of the inner surface of the cheek, lips, and floor of the mouth are based on the same principles and differ in no important respect from that above described, except that fixation of moulds in position is ensured by pressure of a cork plug in the case of the floor of the mouth and by moulding round the lip so as to take firm hold on the chin in the case of the lower lip.

TONGUE, FLOOR OF THE MOUTH, AND THEIR ADENOPATHIES.

For practical purposes it is useful to consider cancer of the tongue under two main headings, depending on its localisation in the anterior two-thirds or the posterior one-third. The treatment of these two groups differs considerably; when the lesion involves the floor of the mouth alone, the treatment again differs from that of either of the preceding lesions. When the lesion is less clearly defined, due allowance must be made and the treatment modified to suit the peculiar conditions present.

1. *Anterior Two-thirds of Tongue.*

Treatment is here directed to two distinct fields, the tongue and the neck.

(*a*) *Tongue Lesion.*—The treatment of the primary lesion of the anterior two-thirds is carried out by the well-known method of radium-puncture, the details of which differ but slightly from those of the technique commonly employed for similar lesions in this country. A uniform distribution of needles containing radon as previously described is possible with fair accuracy in lesions of limited extent. They are inserted without general anæsthesia after blocking the lingual nerve of one or both sides as required by novocain. They are sutured in position with silk and retained from five to seven days.

(*b*) *Treatment of the Glands.*—The results of operating on the glands of every case of carcinoma of the tongue treated for several years have shown that an important percentage of the glands clinically perceptible are not malignant. Further investigation shows that this non-invasion of the glands is more commonly associated with small unilateral lesions of the anterior two-thirds, and is less frequently associated with lesions of the posterior one-third and floor of the mouth. On the other hand, cases occur frequently in which no glands are clinically present but are discovered at operation and turn out to be malignant when examined microscopically. Therefore, irradiation of all cases would subject a considerable number of patients to unnecessary inconvenience and discomfort to no purpose, whilst non-treatment of cases in which no glands are perceptible would certainly be followed by the development in a certain number of glands which in due course would manifest malignant characters.

The present rule adopted where the primary growth is small, unilateral, strictly localised to the dorsum in its anterior two-thirds, and appears to have reacted well to local treatment by radium-puncture, is to treat the glands of that side by irradiation when they are clinically malignant. Where no glands are palpable, or, if palpable, they do not possess malignant characteristics, a block dissection is performed on the side of the lesion to ascertain the presence or not of malignant glands. If present, it may be presumed that the operation alone holds good prospect of cure under such ideal conditions before fixation is present and no further treatment is given. If malignancy is not present, the patient and surgeon are reassured as to the prognosis, and the patient has escaped the unpleasantness of a severe and useless irradiation.

In all cases other than those just quoted, irradiation of one or both sides of the neck is performed, and operation holds no place. That is to say, all necks are irradiated, usually bilaterally, in all cases of carcinoma of the anterior two-thirds (with the exception just mentioned), posterior third, and floor of the mouth.

The method of irradiation is on the same lines and involves the same principles as were indicated for the treatment of skin cancers by surface therapy. By increasing the distance so that the radiant surface is parallel to but situated at 6–8 cm. from the skin, and greatly increasing the charge of radium up to often ½ g. a miniature bomb is formed. The radiant surface is held at the required distance from the plaque of wax moulded to the skin by pillars of cork. The whole is surrounded by lead 4–5 mm. thick, the outer surface of which is again covered by wax to absorb secondary radiations. The radiant surface formed by fixing the requisite number of tubes of radium, screened by 1 mm. Pt., thus produces a well-distributed irradiation of the glandular field over which it is applied. The area treated is accurately measured and the dose given over eight to ten days which, experience teaches, will produce a selective chute of the epidermis, the apparatus being worn several hours a day, often ten, in a recumbent position with the neck well extended. The treatment of the other side follows that of the first, a useful cross-fire effect being thus produced.

The hours of treatment and discomfort of the patient might both be considerably reduced by the use of a suitable sized bomb of 2 g. or so in such cases, relieving the patient of the weight of the apparatus.

2. *Posterior Third of Tongue.*

In this lesion it is difficult and often impossible to produce a uniform irradiation by means of radium-puncture alone, owing to difficulty of access, and frequent extension to the vallecula, epiglottis, &c. It is not justifiable, therefore, to satisfy oneself with this treatment alone. It must be supplemented by an irradiation from the exterior.

The procedure adopted is to treat as efficiently as possible the lesion by radium-puncture on the usual lines, employing local anæsthesia. As soon as the treatment is finished, the supplementary treatment from the exterior is commenced by a bilateral application, first one side, then the other, as described for glands in the neck. This irradiation is designed to treat both the glands and the primary growth simultaneously, and for this purpose the radiant surface has to be arranged to reach a level which will permit irradiation across the base of the tongue. The total treatment takes three weeks. Hence operation to define the malignancy or not of glands is not justifiable, since the external irradiation is necessary for the cure of the primary and should not be postponed.

The time required for operation and healing would put off the supplementary irradiation ten days, during which time the primary is perhaps becoming resistant to further irradiation.

3. *Floor of the Mouth.*

In the treatment of this lesion radium-puncture is dangerous owing to the proximity of bone, and is likely to produce osteo-radionecrosis of the mandible whilst not curing the lesion.

Treatment is therefore planned so that a cross-fire effect is produced on the lesion by surface irradiation from within and without the mouth, using only the most penetrating rays, thus avoiding the possibility of bone complications as far as possible.

Treatment is commenced by moulding a suitable thickness (a few millimetres only) of Colombia paste to the lesion, charging it not too strongly, and aiming at the sterilisation only of the superficial part of the lesion. The apparatus is maintained in position several hours a day for five to seven days until a sufficient dose has been given. It is held in close apposition to the lesion by giving the patient a suitable rubber cork to insert between his upper teeth and the upper surface of the mould. By biting on this firmly during applications, not only is the mould immobilised but the upper jaw, lips, and tip of the tongue are held out of danger.

Internal application is immediately followed by external applications of large packs to both sides of the neck, which are modified to extend forward over the submental region, and are directed more upwards than in the case of the average apparatus for treatment of glands in the neck. This external application represents the most important part of the treat-

ment of the floor of the mouth, owing to the large ports of entry permitted through the submaxillary and submental triangles of each side. Here, again, the importance of continuing the treatment of the primary growth uninterrupted must take precedence over any inclination to operate on the glands.

Where the lesion extends into the base of the tongue it is necessary to supplement the treatment by a radium-puncture confined to this region, which cannot be treated by the surface application successfully. Great care must be exercised not to carry the radium-puncture farther forward than is strictly necessary.

Where the lesion already involves the bone, necrosis must inevitably occur if cure is to ensue. The necrosis is, however, more limited by employing the technique described than is possible when methods such as radium-puncture and seeds are employed, with their inevitable caustic radiation.

CERVIX UTERI.

The method employed is intracavitation radium therapy, by the application of a uterine sound of rubber containing a variable number of radium tubes according to the length of the canal previously determined, and a vaginal applicator, the colpostat, which consists essentially of two cylindrical hollow corks, held apart by watchspring, each containing a radium tube.

The uterine sound is rendered semi-rigid by introducing into it a cylinder of thin aluminium 1/20 mm. thick. The tubes inserted in an ordinary case are two of 13·3 mg. and one of 6·6 mg. Ra. el., all having a wall of 1 mm. Pt. In each cork of the colpostat is placed a tube of 13·3 mg. The spring and corks are wound round with rubber and collodionised. A central cork containing 6·6 mg. Ra. is usually inserted between the cervix and the spring of the colpostat, each cork of which rests in a lateral fornix. All tubes used in the vagina have a primary filtration of 1·5 mm. Pt.

This application is performed without anæsthesia, with but little discomfort except a little during dilatation. A light packing to maintain the central cork in position is all that is necessary. The whole outfit is removed daily, sterilised whilst the patient receives a vaginal douche, and reinserted. The apparatus is retained for five days, except for such daily removals.

Such a treatment giving a total dose of 60 Mcd. or approximately 8000 mg. hrs. may be said to be typical. Actually, whilst the dose varies but little, the number and strength of foci used are greatly varied to suit the individual, by the addition of further uterine tubes and the insertion often of two or three central corks, always accompanied by a corresponding decrease in the strength of tubes, a 13·3 mg. tube being replaced by two 6·6 mg., so that uniformity of irradiation may be as complete as possible.

This treatment unsupplemented is considered effective only for Grade 1 cases, where disease is confined to the cervix. In all other cases supplementary treatment by deep X rays or radium at a distance is held to be essential, and is always given, either before or, more usually, after the local treatment. In this region, deep X rays seem to give results as good as those by bomb therapy as a supplementary treatment.

Various techniques employed in England to-day, whose local treatment probably falls far short of the efficacy of the above-described treatment by colpostat and sound, do not include any supplementary treatment to the parametria and pelvic glands. Little wonder that certain gynæcologists still regard operation as preferable to irradiation. A well-planned operation seems preferable to a half-hearted irradiation, but it is to be hoped that the latter method will disappear, and give place to a whole-hearted, well-planned treatment by radium and deep therapy combined, which may be capable of improving on the results of the best operative technique.

SCOTLAND.

(FROM OUR OWN CORRESPONDENT.)

Physical Welfare at Edinburgh University.

THE Edinburgh University Court has appointed Colonel R. B. Campbell as director under the scheme for the promotion of the physical welfare of students and the development of University athletics. Some years ago Dr. Tait Mackenzie, of Pennsylvania University, lectured in Edinburgh on the need for placing the physical welfare of students on a sound medical footing. In his own university he has charge of the health of all the students, grading their exercise (or no exercise) to suit the physical condition on entry and throughout the curriculum, and selecting from time to time those who show special aptitudes for the heavier games. In a University of some 10,000 students this is an onerous task, but Dr. Mackenzie seemed satisfied that the general results were good. His sculptures show what ideals he aims at.

In Edinburgh, where the number of students approaches 4000 (men and women), the University has not seen fit to appoint a qualified medical practitioner, but a distinguished army officer. His record commands respect; but the physical welfare of the students, it is hardly necessary to say, is not even primarily a question of athletics: it is first a question of health and adaptation of selected exercise. For many years the students at the Provincial Training Colleges have been under medical supervision and each has access to the doctor. About twenty years ago the Scottish Education Department succeeded in displacing the drill sergeant from the elementary, higher grade and secondary schools, and in securing the appointment of a superintendent of physical education trained by the College of Hygiene in Dunfermline or places of similar standing. The system of physical education in all classes of schools is now well organised and under the direction of the medical officer of the department, who also inspects the hygienic training of teachers at the colleges. The idea now being pushed forward is that physical education shall come more and more under the direction of the school medical officer.

The problem at the Universities is different and perhaps the University Court may mean to place an adequate medical staff at the disposal of the director. The matriculation fee has been increased by 10*s.* a year to form a physical welfare fund. Lord Constable's Committee also recommended that an officer of the University should be appointed to direct in a general way the athletic activities and the physical culture of students. The work of the director is not, therefore, confined to athletics. He has himself been inspector of physical training in the army and experience will have taught him where the weak points in candidates for physical culture lie. But, in the end, if the system is to succeed in fitting the student to his work, the physician and the surgeon will both have to come in at some stage. It cannot be assumed that the big proportion of students unfit for violent games are to pay an extra fee merely that the more fit may be better equipped and trained. It is not necessary now to say anything about the correlation of cerebral with muscular training. But the problem is far from simple.

Night Baking.

The proposal to abolish night baking has caused considerable disturbance in the Glasgow trade. It is alleged that only a small proportion of the employees will benefit from the abolition and a large proportion will be seriously disadvantaged. The price of bread, and particularly of rolls, it is said, will certainly rise. During the war, when an officer of the Scottish Board of Health in order to economise consumption suggested that no bread should be sold that was less than 36 or 48 hours old (I forget the exact figure), the great objection was that this would involve expansion

of premises in order to accommodate the accumulated loaves. By the present system they are cleared out at the earliest possible moment. Probably the same difficulty would arise from the abolition of night baking; for some of the Glasgow employers seem to make a point of providing fresh bread and maintain that bread half a day old, or even a day old, would be stale. This, of course, is nonsensical. The objection to "stale" bread is a matter of taste, many consumers preferring it to fresh bread. There is, however, no doubt that the abolition of night baking will involve a very serious rearrangement of hours and duties. It is to be noted that the abolition of underground bakehouses took about a generation to accomplish. There is a doubt whether it is fully accomplished yet; to the small shop-keeping baker the convenience of the underground bakehouses is so great as to override every other consideration. The employees of the Edinburgh trade meet all these points in detail, and point out that the abolition of night baking was recommended after a full inquiry into all the conditions.

Edinburgh Death-rate.

The Edinburgh death-rate for 1929 was 15·1 per 1000 as against 13·7 per 1000 in 1928. The increase is said to be due to the influenza epidemic and to 638 deaths from pneumonia. The infantile mortality was 80 per 1000 births as against 75 per 1000 in 1928. The population shows a tendency to decrease. There is considerable shifting of population within the City itself. One striking fact is that not a single death from measles has been recorded in the City since July, 1928. This is probably a record. In the years 1893–95 measles swept away hundreds.

Dr. William Macrae Taylor.

By the death of Dr. Macrae Taylor Edinburgh has lost one of her most attractive personalities. Dr. Taylor was not merely a widely educated physician and surgeon, but also a man with a gift for social affairs. He was ready to do work that medical men do not as a rule find interesting. For example, he acted for a period as treasurer to the Medico-Chirurgical Society and the Obstetrical Society, as well as to the Tuberculosis Society. This meant a great deal of correspondence and troublesome detail. But Taylor used the occasion to bring harmony and coördination into the working of the various societies, and he did so with the ease that comes of a large and pleasing temperament. For more than 25 years he was medical officer of Cargilfield School for boys, which is one of the best-known schools of the English public school type in Scotland. As far back as the Boer War he held a commission in the R.A.M.C. and in the Great War he did more than his share. He was a Territorial officer and at once volunteered for service abroad, going to France in 1915. In 1916 he became D.A.D.M.S. with the 69th Division. He also saw service in Italy, and in 1919 retired with the rank of Surgeon-Major. He seemed by nature adapted to offices involving responsibility and work was no trouble to him. In many ways the profession in Edinburgh has shown how much he was respected as a medical man and how much he is missed. He was a favourite all round and belonged, perhaps, less to the highly technical and specialised medicine of to-day than to the medicine of one or two generations ago when the larger men were not too much occupied to take an active part in the social life of a cultured city.

A HOSPITAL FIRE.—At 5 A.M. on Jan. 25th a night nurse at Bristol General Hospital gave an alarm of fire, and it was found that a room on the first floor used for developing X ray photographs was ablaze. Dr. S. H. Griffiths, the senior resident surgeon, and the night staff succeeded in keeping the fire within bounds until the arrival of the fire brigade, when it was speedily extinguished. There were 250 patients in the hospital and three wards were for a time in danger.

IRELAND.

(FROM OUR OWN CORRESPONDENT.)

Hospitals and Lotteries.

A BILL obtained its first reading in the Dáil before Christmas, the object of which is to grant powers to enable funds to be raised by means of sweepstakes and drawing of prizes for the support of public charitable hospitals and sanatoriums in the Irish Free State. A deputation of medical men connected with some of the Dublin hospitals waited on President Cosgrave last week to ask him to facilitate, as far as possible, the further passage of the Bill. Hitherto the Government has maintained a strict attitude in regard to sweepstakes and lotteries of all kinds, and has refused to make exceptions for hospitals or other charitable institutions. The deputation pointed out to the President that some of the Dublin hospitals are in a bad way financially, owing to the falling off of subscriptions and the increase of expenditure. The work of the hospitals is being hampered by shortness of funds. The President promised to give the representations made to him his best attention. Coincidently with the visit of the deputation alarmist rumours as to the position of some of the hospitals have appeared in the daily press. It is stated, for example, that unless some means of raising money is discovered a number of the Dublin hospitals must be closed. No hint is given as to the particular hospitals which are in this plight, and it is, therefore, impossible to investigate the accuracy of the statement. As far as can be discovered, however, no hospital has had as yet to consider the problem of closing its doors. While it is generally recognised that the problem of finance is a serious one to the Dublin hospitals, there is a good deal of difference of opinion, both in the medical profession and among lay governors of hospitals, as to whether sweepstakes and lotteries are the best way of raising money. There is the general objection to public lotteries which has induced most civilised Governments to declare them illegal. Apart from this, it is thought by many that the temporary relief which may be given by a successful lottery will be followed by a greater reaction which will diminish further than ever the ordinary income of the hospitals from subscriptions. Much of the falling away in the income from subscriptions appears to be due to the generally accepted opinion that the hospitals receive an adequate income from the payments made by patients. If the public get the further notion that the hospitals have a gold-mine within their reach in the form of a lottery or sweepstake, subscriptions are likely to fall further.

Death of Mr. Kennedy Cahill.

The sudden death of Mr. F. Kennedy Cahill on Jan. 27th has come as a shock to many friends. He had been in his usual health when retiring the evening before. Mr. Cahill qualified in 1901, and was admitted to the Fellowship of the Royal College of Surgeons in Ireland in 1907. Having spent a few years in his younger days as poor-law medical officer at Dundrum, Co. Dublin, Cahill moved into Dublin and devoted himself to practice in the specialty of diseases of the stomach. He was much interested in art and literature, and had many friends among the artistic and literary people in Dublin. He was a kindly and simple character, liked by everyone, and never happier than when doing a kindness.

SYON PARK AND WEST MIDDLESEX HOSPITAL.—At the meeting of the Middlesex County Council at the end of last week there was some discussion upon the proposal of the Rivers Committee of the Council that a portion of the park of Syon House, Isleworth, should be taken for sewage disposal purposes. Captain Burgess pointed out the undesirability of establishing sewage works close to the West Middlesex Poor Law Hospital, Isleworth, which at present has 400 beds and will shortly have 700. It has been decided not to proceed with the proposal.

BIRMINGHAM HOSPITALS CENTRE.

AWARD IN DESIGN COMPETITION.

FOR many years past the Executive Board of the Birmingham Hospitals Centre has been giving earnest consideration to the subject of securing a closer coördination of hospital and medical facilities in Birmingham, and in the more recent years has devoted its activities to the preparation of a practical scheme for this purpose. The completion of a schedule of all known requirements was effected in 1929, when 12 architects were selected to take part in a limited competition for designs for a general hospital of 740 beds, a paying patients' block of 100 beds, and buildings for the medical faculty of the University. The faculty is at present housed in the city, some two miles from the present University site. The assessor's award has now been made, and the possibility, long in the minds of some of Birmingham's foremost citizens and doctors, of making the city the hospital capital of Great Britain, has been advanced an important step forward.

How the Scheme Arose.

The origin of the hospitals centre scheme goes back to 1920, when the city was able to resume normal conditions after the war. The ruling factor in the situation was that both the two leading voluntary hospitals, the General and the Queen's, had an increasing deficiency of beds relative to the demands made upon them and the growth of population. How was this deficiency to be met? Was the right solution simply to extend each hospital so as to provide the increasing accommodation required by civic needs and also meet the demands made by the growth of science in the many auxiliary services required? Each of these hospitals was in a densely populated quarter, and, apart from other considerations, expansion promised to be neither easy nor economical.

The medical school of the University was also concerned. Each of these hospitals was a teaching hospital for that school, and the medical staffs were closely linked up with the members of the medical faculty. The two voluntary hospitals, in fact, were not only hospitals for civic needs, but also an integral part of a coördinated scheme of the medical school; they were the chief centres where medical students would be trained and facilities provided for the advance of medical knowledge, for research, and for linking up the clinician with the scientific personnel of the University departments in such subjects as anatomy, physiology, pathology, bacteriology, and biochemistry.

Growing Hospital Developments.

The Board kept constantly in mind the triple function of a voluntary hospital which is also a teaching hospital—namely, (1) to provide the best medical treatment available for its patients; (2) to be a school for the training of future members of the medical profession and also, not less important, the nursing profession; and (3) to be a centre for the advancement of medical knowledge and science, which cannot be separated into a compartment by itself but must be linked with other scientific departments in the University, such as biology, chemistry, and physics. Each of the two hospitals concerned evolved a separate and independent extension scheme, and this brought the whole situation to a head. By that date—i.e., about 1923–24—many of those most deeply interested were aware that in other great industrial and civic centres, both in Great Britain and on the Continent, the right solution of the hospital problem was being found in going outside the main centre of population and building up on unoccupied ground a hospital centre, with free ground for expansion as the future required, and for linking up with all sorts of subsidiary and specialised institutions. The same argument had prevailed in 1900, when it was decided by the founders of the University to establish a University quarter at Edgbaston.

Science and medical science continuously develop. It is impossible to predict what form they may take or what requirements are essential to meet their needs, and those who advocated a hospitals centre for Birmingham felt that no extension, however considerable, of the General and the Queen's would really meet the demands of the future; it would be at best only a temporary solution for this generation. But where was the site for this centre to be found? This was both a question of money, of hospital, and

FIG. 1.

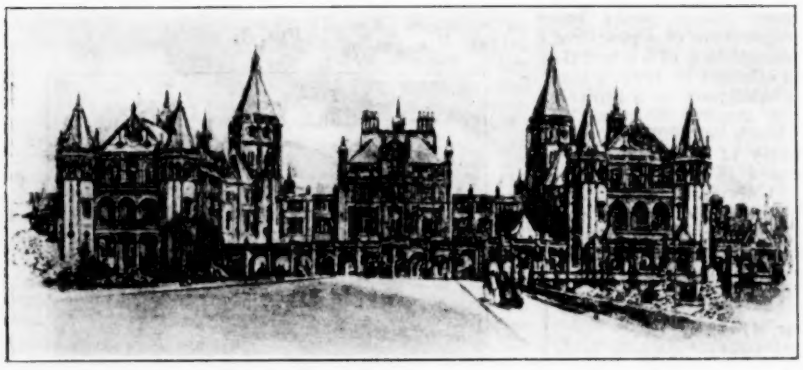
The old Birmingham General Hospital in Summer-lane, opened in 1779.

FIG. 2.

The same in 1895 just prior to the move.

of medical school requirements. The argument already outlined indicates that the new hospital ought to be somewhere in immediate relation to the University, and particularly its scientific departments. The latter had already migrated to Edgbaston.

FIG. 3.



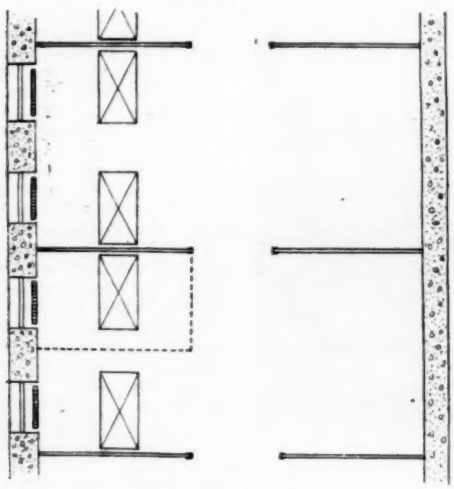
The new General Hospital in Steelhouse-lane opened in 1897.

but so long as its two central teaching hospitals remained on their present sites it was impossible to transfer the medical faculty from Edmund-street to the Edgbaston site.

Amalgamation on a New Site.

Agreement was reached at last when Messrs. Cadbury Bros. offered to the city 150 acres of land at Edgbaston lying to the north-west of and immediately adjoining the University buildings. It was only necessary to allocate (say) 25 acres of this new site to provide everything that a hospitals centre for the next 20 years would require, and which could then be linked up definitely with the University on the other side of the canal. The next step was to bring the General and Queen's Hospitals into agreement, and a joint committee was formed of representatives of both hospitals, under the chairmanship of Sir Charles Grant Robertson, to investigate the problem and recommend a solution. The committee's report contained the two main points: (1) that the new hospitals centre should be established at Edgbaston and should be under the joint control of the General and Queen's Hospitals—that is to say, it was to be a joint extension of both hospitals, taking the place of the separate extensions which had been contemplated and prepared; (2) that in order to achieve this satisfactorily, the General and Queen's Hospitals "should be amalgamated for all purposes."

FIG. 4.

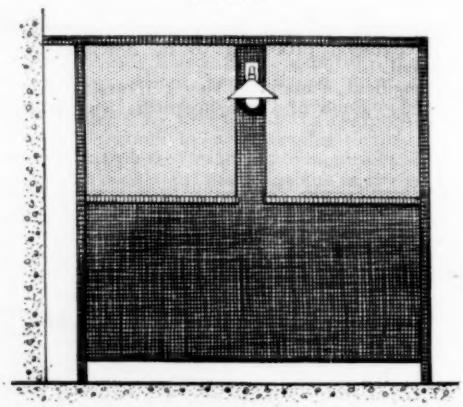


Plan of a ward unit with the new lengthways arrangement of beds.

Both hospitals having accepted these and the other recommendations in the report, an Executive Board was set up for the new hospitals centre with Sir Charles Robertson as chairman. Its first function was to make a detailed and technical scheme. Commissions were sent to the Continent and to the United States to study recent developments in hospital design and organisation, and a scheme was framed on the basis of the reports of these commissions. Finally an architects' competition was arranged with Mr. Percy H. Adams, F.R.I.B.A., as assessor.

Concurrently with the investigations of the Executive Board, the whole question of the organisation of the medical school has been under the careful consideration of the Medical Faculty of the University, and which has been kept in close touch with the Board's deliberations. It was the function in particular of the Faculty to decide on the character and requirements of the medical school as a school of the University, and their recommendations were finally accepted by both the University and the Board.

FIG. 5.



Elevation of the screen which separates the heads of adjacent beds in the new ward arrangement.

A Scheme with Three Aims.

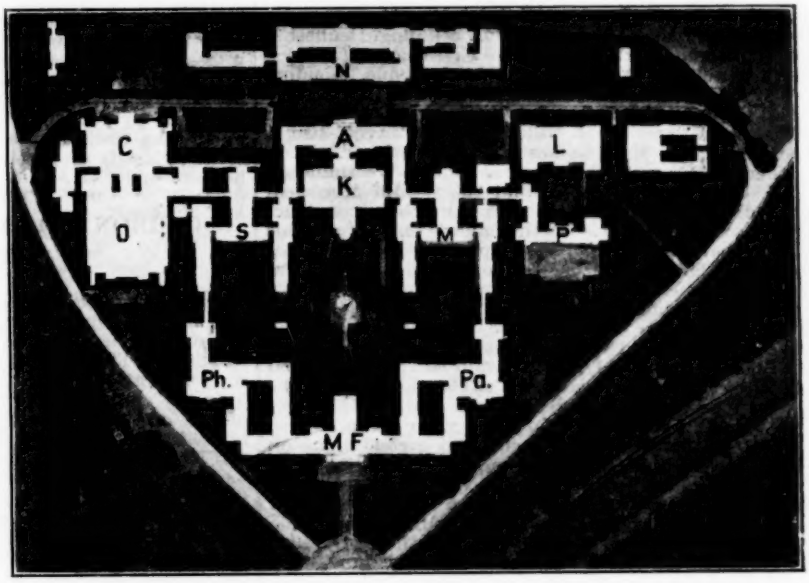
Three main characteristics of the scheme make it unique for Great Britain.

1. The hospital proper will represent the latest ideas and experience in the design, planning, and administration of a hospital considered simply as an institution for the treatment and cure of disease. Neither trouble nor investigation has been spared in order to see that this aspect has been fully met. When the scheme is completed Birmingham will have a hospital at least the equal of any in the world.

2. In accordance with the trend of modern ideas and needs, the scheme includes a big block, also designed on the most modern lines and in close relation to the hospital proper, for paying patients. The Birmingham citizen who does not come within the ordinary category of hospital patient will thus enjoy at the lowest available cost the advantages of institutional treatment and will have at disposal all the skill and experience of the medical, nursing, and administrative staff. The new hospital centre is to serve the needs of *all* classes of citizens.

3. There will be close and integral connexion between the scientific departments and buildings of the medical school and those of the hospital proper. Both the Board and the Faculty were agreed that the link between the scientist and the clinician was essential for the treatment and cure of disease, no less than for the training of students and for the advancement of medical knowledge. In the proposed linkage between science and treatment, between the clinician and the scientist, between laboratory and ward, the centre will be working on the lines accepted in the newest and most progressive hospitals and medical schools on the Continent and in America.

FIG. 7.



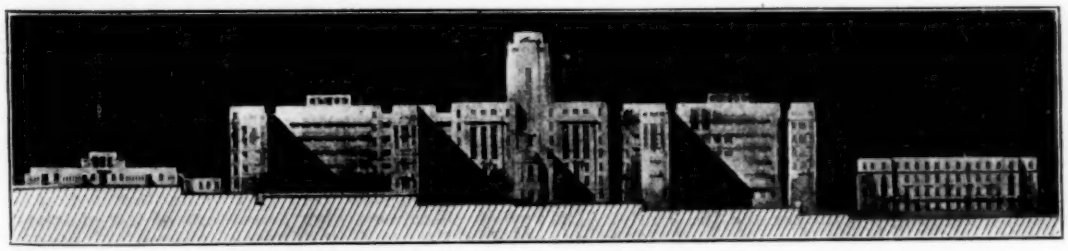
Site plan of the same showing completion of the quadrangle by the medical faculty building on the south.
C = Casualty. O = Out-patients. S = Surgical block. M = Medical block. K = Kitchen. A = Administration. N = Nurses' home. P = Paying patients. L = Laundry. M.F. = Medical faculty. Ph. = Physiology department. Pa. = Pathology department.

It is estimated that the scheme when completed will have cost something approaching £1,250,000. In carrying it through Birmingham aims at influencing scientific thought and civic progress elsewhere. Laymen and leaders of the medical profession in Birmingham have worked whole-heartedly together in the preparation of this scheme, but the decision finally rests with the citizens of Birmingham, to whom an appeal will be made in March.

Plan of the Wards.

In planning the wards it was suggested to the competing architects that the unit system should be adopted. Each member of the senior staff was to be provided with a unit of 60 beds and accessory services, such as clinical laboratories, record-room, operating-theatre (on the surgical side), for which he is responsible; all of them where possible on the same floor and under the control of one sister. The 60 beds were to be divided equally between the sexes, with, in either case, one ward of 16, two wards of 4, and three wards of 2 beds each. The architects were asked to think of the beds lying as far as possible parallel to the windows, instead of at right angles to them, which will result in an arrangement of the 16-bed ward familiar enough in America although not yet seen anywhere in this country; it is, however, we believe, on the specification for the new Southend hospital. The beds, as will be seen on the rough plan (Fig. 4), will back on to partition screens projecting 8 feet into the ward; each bed will thus have its own window and radiator on one or other side, no patient being compelled to look straight into the light. The arrangement makes it easy (as shown by the dotted line) to place a temporary screen round a particular bed which will still retain its own light and ventilation. The screen (Fig. 5) itself is of sheet metal below with glass panels above, divided by a mullion carrying electric lamp, bell, wireless, and so forth; for cleanliness and ventilation the screen does not reach either the wall at the side or the floor below. The screens are placed 19 feet apart, and there is a clear space of 6 feet down the centre of the

FIG. 6.



Winning design for the Hospitals Centre in Edgbaston. South elevation of the hospital block.

ward. This longitudinal arrangement of beds reduces by a couple of feet or so the width of the ward (which need only be 22 feet) and therewith the cost of construction by quite a large amount.

The Winning Design.

Prizes of £500, £300, £200, and £100 were offered for the four best plans sent in, and the winning design was submitted by Messrs. Lanchester & Lodge (19, Bedford-square, London, W.C. 1.), the others in order of merit by Mr. S. N. Cooke (Sun Building, Bennett's-hill, Birmingham), Mr. Charles E. Elcock (of Elcock and Sutcliffe, 21, Northumberland-avenue, London, W.C. 2), and Messrs. Pite, Son, and Fairweather (12, Carteret-street, London, S.W. 1.) bracketed with Messrs. W. and T. R. Milburn (10, Fawcett-street, Sunderland). Mr. Lanchester is the designer, among other things, of the Central Hall, Westminster, the University of Leeds, and the Cardiff Municipal Buildings, and is now carrying out the reconstruction scheme of St. Bartholomew's Hospital; his colleague, Mr. Lodge, has specialised in hospital work. Their design is a remarkable architectural effort; some idea of its impressive character may be gained from the elevation of the south aspect reproduced here (Fig. 6). The administration block is centrally placed with the chapel in the middle and the blocks of wards lying right and left of this central building; at the extreme end of the elevation to the left is the out-patient department and to the right the block for paying patients. The main access runs from north to south, with the nurses' home on the highest ground, then the hospital and, finally, nearest to the entrance from the University and stretching across the site with a main façade of over 600 feet, the medical faculty building with the library overlooking the road leading to the University. A glance at the site plan (Fig. 7) will show how every section of the hospital community seems to have been considered in regard to light and air, although one cannot avoid the impression that the nurses' home, situated so closely north of the administration block, will have much of its possible sunshine cut off in the winter months. The medical faculty is housed in a low building on the south side of the main frontage only two floors high, which will be a boon to the students attending lectures, who will be freed from the tiresome necessity of ascending and descending innumerable stairs. Inasmuch as all the buildings are planned inside a ring road it is feasible to connect them by covered ways and corridors. Communications are all well thought out, especially the service from the central kitchen, which, curiously enough, seems to err if anything on the side of being rather large.

MEDICINE AND THE LAW.

Workmen's Compensation: Effect of Wife's Ill-health.

A RAILWAYMAN, living in a country village in Lincolnshire, refused to go to any of the places where work was offered him. He had lost an eye in an accident in October, 1928, and was paid compensation at the rate of 30*s.* a week till February, 1929, when the weekly sum was reduced to 7*s.* 7*d.* His pre-accident earnings were over £3; the London and North-Eastern Railway, his employers, offered him work at £2 6*s.* 9*d.*, but he refused the offers because of his wife's ill-health, and because he could not get accommodation suitable for her and the family. The county court judge found that the work offered was suitable. The question was whether a workman was entitled, for the purposes of the Workmen's Compensation Act, to refuse to take suitable work in a different town on the grounds of the health and housing of his family. The county court judge declared himself unable to take into account the lack of accommodation, the wife's health, or the state of the labour market. The Court of Appeal has upheld this decision. The Workmen's Compensation Act, says Lord Justice Scrutton, excludes the consideration of the workman's ties to his family. "Supposing he had ten children and two of them were liable to consumption, he could not refuse suitable employment on the ground that his two children could not live in the place where the work was offered."

The point does not seem to have been decided before. This refusal of work in connexion with workmen's compensation (by a workman whose capacity has been reduced by accident but who is nevertheless able to earn in some suitable employment wages which will save his employer from paying him compensation as for total incapacity) must, of course, be distinguished from the topic, recently much discussed by Parliament, as to the steps which a man must take towards the positive pursuit of work in order to justify the receipt of unemployment insurance benefit.

CARBON MONOXIDE POISONING.

AN AMERICAN REPORT.

THE American Medical Association recently appointed a committee to consider the risks of carbon monoxide poisoning and the best way of preventing fatalities. This Committee has just published its first report,[1] drafted by Prof. Yandell Henderson.

In the course of this review it is stated that most of the cooking stoves and heaters in which gas is burned have the defect that the flame of the burning gas is chilled when it comes near a cooking utensil and the chilling stops combustion at the first stage, liberating carbon monoxide. Cooks who work with such stoves very often have the headaches which are typical of a low grade of intoxication by this gas. The defect can be remedied to a certain extent by increasing the distance between the orifice of the gas burner and the cooking utensil, which should be held just above and not in the visible flame. When patients are found dead in closed rooms where there is a stove or water-heater the accident is often attributed, not to carbon monoxide, but to "exhaustion of oxygen in the air by the fire." This explanation, however, is incorrect, for if the oxygen were reduced to 16 per cent. the fire would go out, but life would not be threatened until the quantity was down to about 8 per cent. All such fatalities are in reality due to carbon monoxide. Another risk to life arises from the fumes of burning buildings, where carbon monoxide is produced in great amounts and often overcomes the firemen. Similarly, in coal and other mines it is the carbon monoxide far more than the explosion that causes the death of the miner. Carbon monoxide produced from water-gas is being used more and more in industry as the starting-point for the manufacture of such substances as methanol.

Poisoning from Illuminating Gas.

The Committee points out that while gas is a common means of suicidal death it also causes a number of accidental deaths. The gas used in American cities to-day is formed either by the destructive distillation of coal, which produces a gas containing about 7 per cent. of carbon monoxide, or else by blowing steam through red-hot coal to produce water-gas, which contains 40 per cent. of carbon monoxide. The average city gas in the United States is a mixture of these products and contains about 20 per cent. of carbon monoxide. More than 500 deaths in a year are caused in New York City by an illuminating gas which contains a high percentage of the monoxide. One of the chief difficulties in the way of lowering this mortality is economy. Gas which contains a low percentage of carbon monoxide costs much more than a gas which contains a high percentage. For this reason the Committee thinks it important to educate public opinion to realise that the cheap thing is not the safest and that the best way of paying for gas is on the basis of the heat unit and not of the

[1] Jour. Amer. Med. Assoc., Jan. 18th, p. 179.

cubic foot. Scientific advances during the next few years may lead to the manufacture from cheap coal of a gas which is low in carbon monoxide, high in calorific value, and moderate in price. Such a gas need not involve many fatalities even when used in enormous quantities, and experimental investigations of the possibilities of producing it deserve liberal financial support. Meanwhile much could be done by the elimination of sheer carelessness. Individuals and public authorities in the United States go on countenancing the use of defective pipes and connexions and flueless water-heaters and geysers. Inadequate and cheap apparatus continues to be sold. The Committee recommends that gas should only be burned in appliances with fixed connexions, as even the best quality of flexible piping may become disconnected. It also suggests that the municipality should be responsible for seeing that flues are provided for water heaters and stoves, and furnaces and connexions periodically inspected.

Motor-car Dangers.

The combustion of air and petrol under pressure in the modern car is never complete and the exhaust gas always contains some carbon monoxide, which may reach as much as 7 per cent. when the carburettor is set to supply a rich mixture for quick starting-up in traffic. Roughly, for each 20 h.p. of the motor, one cubic foot of carbon monoxide is produced each minute. The Committee suggest that the newspapers should publish each year before the cold weather begins warnings against starting an engine in a closed garage. The memory of the public is short and, although many deaths have been reported, people still suppose that the danger will not afflict them personally or that at least they will feel some ill-effect before they are overcome. But carbon monoxide gives no warning; its first effect is a sudden muscular weakness which renders the victim helpless. There should be a rule in large garages that no engine may be run for more than a very short time, for if this precaution is disregarded no amount of artificial ventilation will keep the air pure. In repair shops a flexible hose can be connected to the exhaust pipe of the car under repair so that the gas can be conducted out of doors.

Analyses of street air have shown that there is not really enough carbon monoxide in it to be poisonous, but there is certainly enough to join with the fumes of oil, dust, and smoke in contributing to the chronic fatigue of those who breathe this polluted air. It has been suggested that the vertical exhaust, if brought into general use on commercial vehicles and cabs, would considerably decrease the contamination of the air in congested traffic.

Treatment of Carbon Monoxide Poisoning.

The Committee is strongly in favour of inhalational treatment, because the asphyxia of carbon monoxide may continue in full force some time after the patient has been removed from the polluted atmosphere. If he is sent to hospital in an ambulance, he may well die on the way. Every minute of delay increases the chance of fatal injury to the brain, or at least of a subsequent pneumonia or damage to the heart. The carbon monoxide must be eliminated from the blood at the earliest possible moment. The victim should not be moved at all, or only for a few feet. Artificial respiration by the prone pressure method should be started without a moment's delay and continued until breathing returns or there is no doubt of the fact of death. So long as the victim is breathing, artificial respiration is undesirable, but inhalation of oxygen and carbon dioxide should be given at once or, if the mixture is not available, oxygen alone. While one helper sees to the artificial respiration, another should give the inhalation. Meanwhile the patient must be kept warm, and coats and blankets must be put under him as well as over him if he is lying on a cold surface. He should not be allowed to make any exertion until he is completely restored, as the heart may be badly strained thereby. The less the hypodermic syringe is used the better, and the practitioner is advised to leave the work of resuscitation to the specially trained rescue crews of the gas company and fire department if they are available. Transfusion of blood is quite useless though not actually harmful.

The inhalator generally used contains one or two cylinders of oxygen with which 7 per cent. of carbon dioxide has been mixed, and the Committee recommends that every ambulance should carry an apparatus of this kind. There are many advantages in using carbon dioxide as well as oxygen. An asphyxiated patient may not breathe enough oxygen to turn the carbon monoxide out of his blood. Oxygen is not a respiratory stimulant and may even be a depressant, and it is of little use alone where substances such as those of the benzene series have been inhaled as well as monoxide. Carbon dioxide restores full deep breathing, even in profound asphyxia, and displaces other poisonous gases besides carbon monoxide from the blood by inducing rapid ventilation. Moreover, full dilatation of the lungs after asphyxia tends to prevent subsequent pneumonia, which is otherwise common and has a high mortality. Carbon dioxide also rapidly restores the acid-base balance of the blood and tissues. The Committee states emphatically that pulmotors, lung motors, and other mechanical devices for artificial respiration should be replaced by general training in the prone-pressure method (Schafer).

INFECTIOUS DISEASE IN ENGLAND AND WALES DURING THE WEEK ENDING JAN. 25th, 1930.

Notifications.—The following cases of infectious disease were notified during the week:—Small-pox, 313 (last week 414); scarlet fever, 3225; diphtheria, 2033; enteric fever, 41; pneumonia, 1230; puerperal fever, 46; puerperal pyrexia, 139; cerebro-spinal fever, 11; acute poliomyelitis, 5; acute polio-encephalitis, 1; encephalitis lethargica, 14; continued fever, 1; dysentery, 9; ophthalmia neonatorum, 92. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the Metropolitan Asylums Board on Jan. 28th–29th was as follows:—Small-pox, 523 under treatment, 29 under observation (last week 528 and 18 respectively); scarlet fever, 2410; diphtheria, 2720; enteric fever, 19; measles, 954; whooping-cough, 119; puerperal fever, 34 (plus 18 babies); encephalitis lethargica, 121; poliomyelitis, 1; "other diseases," 17. At St. Margaret's Hospital there were 20 babies with ophthalmia neonatorum.

Deaths.—In the aggregate of great towns, including London, there was 1 death from small-pox, 3 (1) from enteric fever, 46 (22) from measles, 14 (2) from scarlet fever, 29 (3) from whooping-cough, 66 (12) from diphtheria, 39 (6) from diarrhœa and enteritis under two years, and 74 (16) from influenza. The figures in parentheses are those for London itself.

Small-pox was mentioned as a cause of death in a case assigned to Leicester (County Borough). The 2 fatal cases of enteric fever outside London were at Salford and Leeds. Measles accounted for 7 deaths in Manchester (where there were 738 fresh cases) and 3 in West Ham; whooping-cough for 6 in Birmingham and 3 each in Liverpool and Bradford. There were 12 deaths from diphtheria in Liverpool, 4 in Cardiff, and 3 each in Bristol, Birmingham, and Coventry. No great town had to report more than 4 deaths from influenza.

The number of stillbirths notified during the week was 295 (corresponding to a rate of 46 per 1000 births), including 53 in London.

DONATIONS AND BEQUESTS.—Mr. Frederick William Smith, of Woodville, Longridge, Lancs, left £1000 to Dr. F. W. Price, of Harley-street, London, to be applied as he shall think fit, for the benefit of the Heart Hospital, London.—Among other bequests, Mr. John Edward Faire, J.P., of Evington Hall, Leicester, left £5000 to the John Faire Hospital and £2000 to the Leicester and Leicestershire Maternity Hospital for general purposes.

Correspondence.

"Audi alteram partem."

MENTALITY AND ANÆSTHESIA.

To the Editor of THE LANCET.

SIR,—In a leading article in your issue of Jan. 25th (p. 193) you were good enough to refer to a paper written by me in the *British Journal of Anæsthesia*. In your kindly notice, however, you have missed, no doubt inadvertently, the main drift of my remarks. In an address I gave before the Royal Society of Medicine in 1920, entitled The Psychology of Anæsthesia, I drew attention to the neglected study of the subconscious side of patients requiring medical or surgical aid. I dwelt especially upon the effect of psychic influence in anæsthesia. The preponderating effects of buried brain-memories and the more recent profound impressions, such as the Great War brought into existence, were considered. The recent article, Mentality in Anæsthesia, was written as an extension and amplification of The Psychology of Anæsthesia. In it I advanced the contention that while most anæsthetists are careful to study and, indeed, to master the intricacies of the physical characteristics of their patients which might bring about unusual reactions of drugs used in anæsthesia, some do not, as a rule, study the psychical side of the problem and such study I submitted was at least as important.

Your reference to my article, however, appears to me to convey the inference that I devoted my remarks chiefly to the physical rather than to the psychical aspect of the problem. I trust that you will permit me, since I contend that the matter is really one of great importance, to correct this error and to point out that the subject of my paper is the psychical and not the physical side of anæsthesia. I am glad to learn that you attach importance to this subject and that the statements which appeared in my former paper find an echo in the concluding paragraphs of your article.

I am, Sir, yours faithfully,

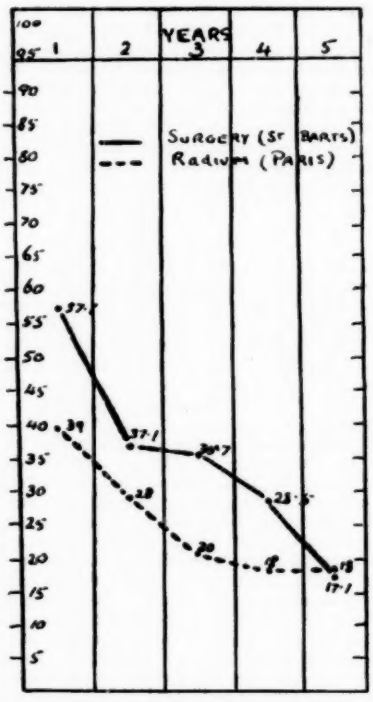
Boxmoor, Jan. 31st, 1930. DUDLEY W. BUXTON.

RADIUM OR EXCISION FOR EPITHELIOMA OF THE TONGUE

To the Editor of THE LANCET.

SIR,—Prof. Gask's admirable study of the treatment of epithelioma of the tongue by radium is of the greatest service at the present time when so many surgeons are trying out the new method. In striving to be fair to radium he is, however, a little less than fair to excision. Many of the figures he quoted are from old statistics. Since they were published the results which have been obtained, owing to improvements in anæsthesia, more extensive dissection of the glands, and the use of diathermic excision for the primary growth, are considerably better. Rendle Short reports 40 per cent. of three-year cures following the complete operation upon the tongue and glands at the Bristol Royal Infirmary.

Last year, for the purpose of the second edition of Recent Advances in Surgery, I had occasion to visit radium centres on the Continent, and to go into the available figures concerning the treatment by excision and by radium of cancers in various situations. The results in cancer of the tongue of operation by modern methods are probably much more fairly represented by the figure of 35·7 per cent. for three years obtained at St. Bartholomew's than by the 20 to 25 per cent. estimated by Prof. Gask. It is therefore hardly just, when referring to the 21·6 per cent. of three-year cures obtained in Paris by radium, to say that "this does not appear to be much better than the results of surgery." The Radiumhemmet figures he quotes give 14 cases alive out of 46 treated, a survival-rate of 30·4 per cent., but many of these had only recently been treated. The latest Stockholm figures in 1929 showed only 13 cases alive out of 71



Epithelioma of tongue. Five-year survival rate of cases treated by surgery and by radium.

treated over a period of six years, or an average of 18 per cent., and 5 of these 13 had been treated less than a year. Prof. Gask further remarks that if the period of observation is extended the percentage of cures by surgery would be further reduced. This is also true of cases treated by radium. The St. Bartholomew's surgical cases show 10 per cent. of seven-year cures, the Paris radium cases 11 per cent. The statement that if the primary growth be treated early (by radium) it can be made to disappear in the great majority of cases also needs qualification; in the cases treated by Regaud with radium the primary growth was not arrested in 56 per cent. In the accompanying graph I have added the curve of the Paris radium statistics, taken from Prof. Regaud's article in the American Journal of Roentgenology and Radium Therapy of January 1929, to that of Prof. Gask.

I do not wish in any way to belittle Prof. Gask's main thesis, which is admirable, or to decry the use of radium in cancer of the tongue, for I use it myself whenever possible. But if we are to advance we must face the truth, which is that at the present time, with the single exception of cancer of the lip, the results obtained by the best workers with radium are inferior to those obtained with excision by surgeons of equal standing. By careful research work, such as that carried on by the unit which Prof. Gask represents, the position may be reversed in the future. But that time has not yet come.

I am, Sir, yours faithfully,

W. H. OGILVIE.

Harley-street, W., Feb. 3rd, 1930.

PSITTACOSIS.

To the Editor of THE LANCET.

SIR,—Notices have already appeared in the press to the effect that a member of the female nursing staff of the Warwick County Mental Hospital is at present suffering from this condition. The following details are, I think, of interest. During December of last year friends of the patient, A.B., purchased in a public market a green parrot. On Jan.9th of this year—that is, after about a fortnight—this bird died. Its dead body was taken back to the vendor, who supplied a new bird. This one was carried back to Warwick by train in a cardboard box by A.B., who herself, when she reached her friends' house, actually transferred the parrot from the box to its cage. Next morning the parrot was found dead in its cage. Two members of the family were taken ill on Jan. 12th, and the third on the 19th. Besides actually handling the parrot in question A.B. had subsequently helped to nurse her ill friends on Jan. 15th. One of these died later.

A.B. herself first noticed symptoms on Jan. 19th. They were fever, nausea, vomiting, and backache. She did not report sick to us until Jan. 22nd, when she had all the symptoms above noted, an extremely dirty brown-coated tongue, a temperature of 104·6° F., and she looked very seriously ill. On Jan. 22nd a blood culture was done which turned out to be sterile. The leucocyte count was 20,400. Agglutination with standard Oxford cultures of *B. typhosus*, *B. paratyphosus* A, *B. paratyphosus* B, *B. ent.* Gaertner, gave negative results down to dilutions of 1 in 25. A dry, troublesome, cough started about Jan. 25th and there are small areas of consolidation in the lungs to account for this. The course of her case has been a steady constant temperature round about 103°F. for the first week, gradually coming down and the symptoms moderating more or less accordingly. The temperature actually touched normal for the first time on Feb. 1st, and is at the present time in the neighbourhood of 100°F. She still has feelings of nausea but the lung signs are clearing up and the patient's condition steadily improving. There has never been any splenic enlargement. On Jan. 25th the leucocyte count was 17,200 and on the 26th was 10,800 (polymorphs, 63 per cent.; lymphocytes, 35 per cent.; transitional, 2 per cent.). On the same day agglutination against the same four organisms mentioned above was again negative. The urine was sterile. No non-lactose-fermenting colonies were found on plates from the stools. On blood culture after 48 hours a growth was obtained in broth of a Gram-negative motile bacillus. Subcultured, this bacillus grew readily and copiously in 24 hours on an ordinary agar slope. It was markedly hæmolytic. It would not ferment glucose, lactose, saccharose, maltose, or mannite. Litmus milk remained alkaline after 24 hours, turning slowly acid after 48. There was no clotting. So far subcultures made each day have remained true to the above type except that the power to turn the litmus red is getting weaker. On Feb. 2nd the leucocyte count was 6400. An organism with apparently the same characteristics was grown from the urine.

I am, Sir, yours faithfully,

A. T. W. FORRESTER,
Medical Superintendent, Warwick County Mental Hospital.

Feb. 3rd, 1930.

SPINAL ANÆSTHESIA.

To the Editor of THE LANCET.

SIR,—I offer Dr. Falkner Hill an apology for misinterpretating him. The explanation of the escape of the phrenic motor roots when numbness in the neck follows a novocain injection, is, I believe, simple.

(1) The upper remnant of a heavy solution tends to affect the posterior roots more than the anterior.

(2) The concentration in the cervical region is too dilute to affect motor fibres.

If a small dose of novocain is injected across the cauda equina between L1–L2, pain sense in the leg is the first to go, then follow touch, muscular sense, and finally motor power. Return is in the reverse order, and an operation on the leg may continue after muscular control has returned. Motor fibres are more resistant and recover more easily than sensory. When after an injection a man is unable by voluntary effort to move his leg, the motor path is blocked as well as the sensory. During the recovery he can stimulate his muscles at will, but the afferent pain path remains blocked. Could this sequence be explained by receptor paralysis alone?

In the dorsal region, Dr. Falkner Hill can find no stimulus for the abdominal muscles, assuming that the efferent path becomes unlocked before the afferent. Are they not part of the normal respiratory mechanism, and do they not receive central stimuli? Failure to get a sufficient concentration of novocain on the anterior roots from D6 down accounts for statements that novocain does not give good relaxation and the early return of rigidity in the upper abdomen is but the natural consequence of a diminishing concentration of novocain from below upwards. The following case is instructive.

Percain normal saline S.G. 1.006. Profound splanchnic block. Man, aged 62, carcinoma of the colon. Resection of terminal portion of ileum, cæcum, and part of ascending colon; lateral anastomosis. At 1 hour 15 minutes during the anastomosis patient complained of pain in the stomach, which persisted until its completion. With a novocain administration this pain would have been preceded by increasing rigidity, later accentuated by painful stimuli. But not so in this case; 20 minutes after pain was first felt the abdominal wall was perfectly relaxed, and was sewn up without the slightest difficulty. The receptors had recovered, but the motor mechanism was unable to respond. The solution was evidently lighter than the cerebro-spinal fluid, and had applied itself more to the anterior roots than to the posterior.

The contrast between the behaviour of these two types of solutions seems to provide some evidence that the roots are the site of the block.

Dr. Falkner Hill, criticising the controllability of spinocain asks, "If expansion is essential for a high anæsthesia, how is it that a high and long anæsthesia is produced when only 2 c.cm. of cerebro-spinal fluid have been extracted?" I would add to this, especially if "gliadin holds the solution together." I find that in order to pass the roots of D5 I must make a direct injection of between 15 and 20 c.cm. of solution between L1–L2. Can it be possible that after all spinocain is, or behaves in the same manner as a heavy solution? If 2 c.cm. of spinocain were quietly injected between L1–L2 without "expansion," would there be no advance on the thoracic nerve roots in the Trendelenburg position?

Dr. Falkner Hill writes: "Though this quality of lightness may be of no physical importance, in the present state of opinion it has a very definite psychological value." I have always regarded spinocain as a great achievement in practical psychology.

I am, Sir, yours faithfully,

London, W., Feb. 3rd, 1930. W. HOWARD JONES.

MENTAL TREATMENT BILL.

To the Editor of THE LANCET.

SIR,—In your issue of Feb. 1st (p. 263) Dr. S. E. White, commenting on a leading article dealing with amendment of the Lunacy Acts, states that—

As regards transient cases of high temperature with delirium (e.g., puerperal, pneumonic, influenzal) it is very undesirable to treat such cases in asylums because there is there no qualified nursing staff competent to take charge of patients in such peril of their lives.

As one who has had 24 years' experience of mental hospitals I feel that I cannot allow such a statement to go uncontradicted. The statement is in fact so far

removed from the truth that one can only conclude that Dr. White has no real knowledge or experience of what she is talking about. She is evidently ignorant of the fact that nurses in mental hospitals who enter for the mental section of the General Nursing Council's examination sit exactly the same preliminary examination as the general hospital nurse. She is also probably ignorant of the fact that facilities exist whereby the nurse who has passed the G.N.C. examination in the mental section can obtain her "general" certificate by two years further training at a general hospital, and that in the Devon Mental Hospital alone no less than five have already shown enough enthusiasm to take this extra course, and so become "doubly qualified."

But apart from this, cases of delirium are so commonplace in mental hospitals that it is absurd to allege that "asylum nurses" are incompetent to deal with them. A "certificated mental nurse" is in my opinion the best possible nurse to attend cases of delirium. She has at least been given special instruction in the psychological aspect of such conditions to which her sister in the general hospital pays little attention. The keenness shown by the mental hospital nurse in this way deserves praise and encouragement.—I am, Sir, yours faithfully,

RICHARD EAGER, O.B.E., M.D.,
Medical Superintendent, Devon Mental Hospital, Exminster.

Feb. 2nd, 1930.

THE CLAIMS OF LOURDES

To the Editor of THE LANCET.

SIR,—On page 196 of THE LANCET of Jan. 25th there appears an annotation headed "Austrian Thaumaturgist." One sentence in this article must have caused much astonishment and disgust in the minds of many of your readers. The sentence reads "the place is in fact a veritable Lourdes, which it resembles in the nature of the diseases cured, which are mainly of a neurotic type with a sprinkling of rheumatic and pseudo-paralytic affections."

I have rarely seen a short sentence which contains so many mis-statements, to use a mild term. I might ask in what possible way does the clinic of this thaumaturgist resemble the shrine of Our Lady of Lourdes, where pilgrims flock in scores of thousands to implore the intercession of the Blessed Virgin for the cure of their spiritual and corporal ills. Then, again, the remainder of the sentence is an absolute travesty of truth. The Bureau de Constatations Médicales at Lourdes is open to any medical man be his religious opinions what they may. These gentlemen are invited to examine and report on all cases claiming to be miraculous cures. Only after a thorough investigation and after the lapse of 12 months is a definite opinion passed on the fact of a miracle having occurred. Perhaps the most surprisingly inaccurate of all the statements contained in this marvellous sentence is that the majority of the cases cured at Lourdes are of the neurotic type, &c. It will perhaps amaze the author of this extraordinary statement to know that such cases are never claimed as miracles or are recorded as such by the Bureau at Lourdes.

In conclusion, I may say that, as a constant reader of your valuable periodical, I am astonished at the action of the Editor of THE LANCET in allowing such a travesty of truth to appear in a scientific journal.

I am, Sir, yours faithfully,
J. B. MOORE, M.B., F.R.C.S.I.

Belfast, Jan. 29th, 1930.

MEDICINES IN THE MASS.

To the Editor of THE LANCET.

SIR,—Your leading article on Medicines in the Mass reminds me that I once saw a patient who took so much medicine that the chemist called every day for orders.—I am, Sir, yours faithfully,

Jan. 29th, 1930. W. HALE-WHITE.

Parliamentary Intelligence.

HOUSE OF COMMONS

WEDNESDAY, JAN. 29TH.

Amendment of the Children Act, 1908.

Sir ROBERT GOWER asked the Minister of Health whether he was aware that the Medway board of guardians had passed a resolution urging His Majesty's Government to initiate legislation amending Part I. of the Children's Act, 1908, to the effect that it should be made compulsory upon intending foster parents to apply to the local authority concerned for the registration of their premises for the reception of nurse infants before the reception actually takes place; and whether he proposed to introduce such amending legislation.—Mr. GREENWOOD replied: The answer to the first part of the question is in the affirmative. This suggestion will receive consideration in connexion with any legislation for the amendment of the Children's Act, 1908, but I cannot give any date for the introduction of such legislation.

Air-gun Accidents among Children.

Mr. FREEMAN asked the Home Secretary whether, in view of the number of accidents from air-guns amongst small children, he would consider the desirability of limiting their use to the holders of a duly issued licence.—Mr. CLYNES replied: If the mischiefs to which the Firearms Act, 1920, was directed by Parliament were found to arise as regards air-guns, power already exists to impose the requirement of a firearm certificate, but those mischiefs do not arise, and I do not think sufficient ground exists for proposing legislation to set up a licensing system with other objects in view.

Naval Officers' Photographs.

Sir NICHOLAS GRATTAN-DOYLE asked the First Lord of the Admiralty whether, with regard to the instructions recently issued requiring all officers at certain stages of their naval careers to submit photographs of themselves to the Admiralty, he would state for what purposes those photographs were required: and at what stages of their naval careers officers had to submit them.—Mr. ALEXANDER replied that, so far as medical officers were concerned, the answer was: on entry and on promotion to surgeon-commander. Dental officers were required to submit photographs on entry and on attaining six years seniority as surgeon lieutenant-commander (D).

THURSDAY, JAN. 30TH.

Diagnosis of Silicosis.

Mr. CECIL WILSON asked the Home Secretary whether any and, if so, which of the recommendations of the departmental committee on the diagnosis of silicosis were to be adopted; and when it was anticipated that the central bureau would be set up.—Mr. CLYNES replied: I have approved generally the medical arrangements recommended by this committee, but I am advised that they cannot be given effect to without further legislation and a Bill is accordingly in preparation. I have already acted on the recommendation of the committee in favour of further research by arranging with the Medical Research Council for the appointment of an expert committee.

Fibrosis of the Lungs and Workman's Compensation.

Mr. MORLEY asked the Home Secretary what further steps had been taken towards scheduling fibrosis of the lungs under the Workmen's Compensation Act.—Mr. CLYNES replied: This is a big question on which I was advised that much further research would be necessary, and I therefore asked the Medical Research Council to set up an expert committee to institute and coördinate research into the subject. I am glad to say that the Council have agreed to do this, and are now engaged in setting up a committee. I understand that the committee is practically complete and will be appointed very shortly.

Defective Schools.

Mr. KINLEY asked the President of the Board of Education the number of voluntary schools listed as defective, or no longer suitable; and the number of children in average attendance at those schools.—Sir CHARLES TREVELYAN replied: The total number of voluntary schools remaining on the black list is 1323. The total number of children on the registers of these schools on March 31st last was 318,892.

Ministry of Health and Meat Extracts.

Mr. FREEMAN asked the Minister of Health whether his attention had been called to an advertisement appearing in many newspapers, and particularly on Saturday, Dec. 28th, 1929, in an evening paper, implying that the Health Ministry

recommended certain meat extracts; whether the recommendation was given; and, if not, what action he proposed to take in the matter to dissociate the Ministry from such advertisements.—Mr. GREENWOOD replied: The answer to the first part of the question is in the affirmative. My department does not recommend this or any other meat extract. But the advertisement does not appear to contain any mis-statement of fact in regard to the Ministry of Health, and while I deprecate such a form of advertisement, I do not think that I can usefully take any action in the matter.

Psittacosis in Birmingham.

Mr. HANNON asked the Minister of Health whether his attention had been called to a recent statement by the medical officer of health for Birmingham that several cases of psittacosis, definitely caused by infection from parrots, had occurred in Birmingham within the past two years; and, seeing that of 11 cases reported in Birmingham during the period stated four had proved fatal, he would say what steps the Ministry had taken to deal with this malady.—Mr. GREENWOOD replied: I am informed that the medical officer of health of Birmingham has not made any public statement of the kind referred to. As regards the second part of the question, I would refer the hon. Member to the answer given on Jan. 23rd[1] to the hon. and gallant Member for Warwick and Leamington.

Mr. HANNON: Has the right hon. gentleman any information from Birmingham of the result of the inquiry which he has ordered to be made, and can he give any information as to what practical steps are being taken to put an end to this malady?

Mr. GREENWOOD: As I explained to the House, investigations are not complete.

Dr. DAVIES: Is the right hon. gentleman aware that both Germany and the United States have prohibited——

The SPEAKER: The hon. gentleman is giving information.

Birth Control.

Mr. MORLEY asked the Minister of Health how many local authorities had desired him to give consideration to the question of allowing municipalities to provide facilities for reliable and private information as to the methods of family limitation.—Mr. GREENWOOD: Fifty-five.

Mr. MORLEY: Will the right hon. gentleman inform the House if and when he is prepared to grant these facilities?

No answer was given.

Vaccination Exemptions.

Mr. THOMAS LEWIS asked the Minister of Health the number of children exempted from vaccination on conscientious grounds during 1929.—Mr. GREENWOOD replied: The number of statutory declarations of conscientious objection received by the vaccination officers in England and Wales during the calendar year 1928 was 277,169. The figure for 1929 is not yet available.

Extension of National Insurance.

Mr. GEORGE OLIVER asked the Minister of Health whether it was the intention of the Cabinet committee charged to inquire into the subject of national insurance and pensions to consider the extending of insurance to persons who, by reason of occupation or income, were excluded from the present schemes of insurance.—Mr. GREENWOOD replied: The question referred to by the hon. Member will be considered by the Cabinet committee.

Medical Practitioners and Death Certification.

Sir GEORGE PENNY asked the Minister of Health whether he would take steps to make it obligatory upon a medical practitioner to view a body after death before giving a death certificate.—Mr. GREENWOOD replied: This subject was fully discussed during the passage through this House of the Births and Deaths Registration Act of 1926; and I am not prepared to introduce further legislation in present circumstances.

Leprosy in India.

Major GRAHAM POLE asked the Secretary of State for India the number of known cases of leprosy in India, and how many of these were segregated either in their homes or in institutions; whether the Government took any steps to effect their compulsory segregation either in their homes or in institutions; and what was the number of leper institutions in India and the total amount contributed out of Indian revenues towards the extinction of this disease.—Mr. WEDGWOOD BENN replied: The number of persons in India returned as lepers at the census of 1921, the last official figure available, was 102,513, but it is probable that the number is considerably in excess of that returned. There are about 40 institutions with about 8000 inmates. The Indian Lepers Act provides that the compulsory segregation of pauper lepers may be enforced in areas to which the Act is made applicable by the provincial governments, but the total number of compulsorily segregated lepers is at present inconsiderable. The number of lepers segregated in their homes, and the total amount contributed from Indian revenues cannot be stated.

The following note has been supplied by Sir Leonard Rogers: "Any attempt at general compulsory segregation is impossible on account of the prohibitive cost, and now that the improved treatment enables most early, but few advanced, cases to be cleared up, compulsion does more harm than good by causing the early, largely uninfective, cases to be hidden until they have become advanced, infectious, and incurable. At the present time about one hundred doctors are being trained in the modern treatment at the Calcutta School of Tropical Medicine, and thousands of lepers are now being treated by them all over India at clinics with far greater effect in reducing leprosy than attempts at segregation, which have invariably proved very expensive failures in all tropical countries where they have been tried."

MONDAY, FEB. 3RD.

All-India Medical Council.

Major GRAHAM POLE asked the Secretary of State for India if it was the intention of the Government to take early steps towards the establishment of an all-India medical council.—Mr. WEDGWOOD BENN replied: The Government of India are anxious to introduce the necessary legislation at the earliest possible date, but it is doubtful whether this will be possible during the present session of their Legislature.

Lieut.-Colonel FREMANTLE asked the right hon. gentleman to do his utmost to impress on the Government of India that, unless there was reciprocity between the two Governments and the two medical councils, Indian practitioners would be debarred from the possibility of practice throughout the rest of the British Empire; and that it was therefore extremely important to keep the General Medical Council and the Council in India working together.—Mr. BENN replied that the Government of India were fully aware of the facts mentioned by Colonel Fremantle.

Central Research Institute in India.

Major GRAHAM POLE asked the Secretary of State for India the intention of the Government of India towards the proposal to remove the Central Research Institute to Dehra Dun, in view of the fact that there would be an absence of the clinical facilities and the scientific coöperation available in larger urban areas.—Mr. WEDGWOOD BENN replied: The Government of India have decided after full consideration to adhere to the proposal to locate the Institute at Dehra Dun. Their reasons were explained in the course of a debate in the Council of State on Sept. 17th.

Small-pox Deaths in India.

Mr. FREEMAN asked the Secretary of State for India how many small-pox deaths were registered in each of the cities of Calcutta, Bombay, and Madras in the years 1925, 1926, 1927, and 1928, respectively; and what was the infant mortality-rate in each city for the same years.—Mr. WEDGWOOD BENN replied: The following tabular statement contains the figures:—

—	Small-pox deaths.				Infant mortality death-rate per 1000.			
	1925	1926	1927	1928	1925	1926	1927	1928
Calcutta ..	3923	934	2860	N.r.	326	372	340	N.r.
Bombay ..	565	476	841	595	359	394	319	314
Madras ..	762	60	32	246	281	282	240	289

N.r.—Not yet received.

Local Government Act, 1929.

Mr. WEST asked the Minister of Health whether he had received any representations from the Metropolitan Boroughs Standing Joint Committe with reference to the scheme which he proposed to make, under Section 101 (6) of the Local Government Act, 1929; and whether he was satisfied that under that Act he was authorised to confer on the London County Council the supervisory powers over certain voluntary associations which were specified in paragraph 3 of the proposed scheme.—Miss S. LAWRENCE replied: The answer to both parts of the question is in the affirmative.

TUESDAY, FEB. 4TH.

After-care of Mental and Physical Defectives.

Dr. FORGAN asked the Secretary of State for Scotland if, in view of the value of the work being carried out in Scotland by after-care committees in connexion with mental and physical defectives, he would consider the advisability of increasing the average annual Government grant of £18 to

[1] THE LANCET, Feb. 1st, p. 268.

a sum more commensurate with their needs.—Mr. JOHNSTON (Under Secretary of State for Scotland) replied: Section 38 of the Mental Deficiency and Lunacy (Scotland) Act, 1913, which authorises Exchequer contributions towards the expenses of societies assisting defectives, is repealed by the Local Government (Scotland) Act, 1929, as from May 16th, 1930. Under the last-mentioned Act contributions for the purposes mentioned may be made by county and town councils, and a scheme providing for such contributions may be made by the General Board of Control. The attention of county and town councils has been drawn to these provisions of the Act.

Medical Treatment for Soldiers' Families.

Major GLYN asked the Secretary of State for War whether the medical treatment for ear, nose and throat troubles which was available free of charge for families of soldiers married on the strength at the Cambridge Hospital, Aldershot, and presumably at the Royal Herbert Hospital, Woolwich, and the Netley Hospital, Portsmouth, was also available at other stations through the medium of civil hospitals; and, if this was not the case, what steps the War Office took to deal with such cases at other stations, either by contributory grants or payments.—Mr. T. SHAW replied: The families of soldiers on the married quarters roll are eligible for medical treatment at the public expense at all stations but only provided that military medical facilities exist. At certain large stations, including those mentioned in the question, there is a military specialist in diseases of the ear, nose and throat, and families of soldiers on the married quarters roll have the benefit of his services. But in accordance with the general policy, no payment is made from Army funds for special civilian medical attendance for these diseases where no military specialist is available.

Protection against Chemical Warfare.

Mr. AYLES asked the Secretary of State for War whether the chemical warfare laboratories were now maintained at Porton and Sutton Oak; and, if so, whether he would state the work upon which they were now engaged.—Mr. T. SHAW replied: Yes, Sir. Research work on protection against chemical warfare is being carried out at both Porton and Sutton Oak.

The Services.

ROYAL NAVAL MEDICAL SERVICE.

Surg. Capt. W. W. Keir to be Surg. Rear-Admiral.
Surg.-Cmdr. H. F. Stephen is placed on the retd. list.
Surg. Lt.-Comdr. J. E. Clark to be Surg.-Comdr.

ROYAL ARMY MEDICAL CORPS.

Lt.-Col. H. St. M. Carter is placed on the half pay list on account of ill-health.

Lt.-Col. F. E. Roberts retires on retd. pay on account of ill-health.

Maj. and Bt. Lt.-Col. E. T. Potts to be Lt.-Col., vice Lt.-Col. J. G. Bell to ret. pay.

Maj. T. Parr from the secd. list is restd. to the estabt.

Capt. D. F. Panton to be Maj.

Lts. P. F. Palmer, D. Bluett, and C. E. Eccles to be Capts.

S. G. Watson is granted a tempt. commn. in the rank of Lt., whilst empld. as a Dental Surg.

TERRITORIAL ARMY.

Maj. A. H. Fullerton, having attained the age limit, retires and retains his rank, with permission to wear the prescribed uniform.

Capt. L. H. Taylor to be Maj.

Lts. H. E. Harding, A. MacG. Duff, and J. H. Donnelly to be Capts.

Lt. W. H. Roberts resigns his commn.

ROYAL AIR FORCE.

W. J. Cumming is granted a short service commission as a Flying Officer for a period of three years on the active list.

Lt. M. J. Pigott (General List, Army, Dental Surgeon) is granted a temporary commission as a Flying Officer (Dental) on attachment to the R.A.F.

Flight Lt. M. J. O'Reilly (Capt., Army Dental Corps) relinquishes his temporary commission on return to Army duty.

INDIAN MEDICAL SERVICE.

Capts. J. P. Arland and D. M. Sachdeva relinquish their temp. commns.

Medical News.

ROYAL COLLEGE OF PHYSICIANS OF LONDON.—An ordinary Comitia of the College was held on Jan. 30th, with Sir John Rose Bradford, the President, in the chair.—Dr. J. W. Springthorpe, who resigned his Membership in 1919, was re-elected a Member of the College.—The President announced that the Mackenzie Mackinnon Research Committee had elected Dr. G. Scott Williamson and Dr. Thomas Cecil Hunt to Mackenzie Mackinnon Research Fellowships.—Sir John Rose Bradford was appointed to represent the College at the Ceremonies of Inauguration of the University Buildings presented by the C. R. B. Educational Foundation and of the School of Medicine presented by the Rockefeller Foundation, to be held at Brussels in June next.—Dr. S. A. Monckton Copeman was appointed Delegate to the Congress of the Royal Sanitary Institute to be held at Margate in June next.—The College adopted the regulations drawn up by the Committee of Management of the Conjoint Board for the institution of a Diploma in Gynæcology and Obstetrics.—In response to a request from the Ministry of Health for the views of the College on the use of anæsthetics in confinements and on the subject of maternal mortality and morbidity, reports on these subjects were considered and adopted for presentation to the Ministry.

The following candidates having satisfied the Censors' Board were admitted Members of the College:—

John Bevan-Jones, Arnold Clark, Reginald Charles Clifford, Cuthbert Leslie Cope, Gordon Cripwell Dewes, Hugh Alexander Dunlop, Florence Mary Edmonds, John St. Clair Elkington, Leonard Findlay, Saradindu Mohan Ghosal, Robert John Gittins, Leo Barclay Heath, Albert Remington Hobbs, Benjamin Brian Hosford, Harold Parnell Jameson, Pandipeddi Kutumbiah, Sydney Charles Lewsen, Thomas Mortimer Ling, Gunvantrai Bhagwatidas Mankad, Hugh Leslie Marriott, Stanley Melville, Ralph Henry Morley, Nathoobhai Dayalji Patel, William Gilchrist Patterson, Walter Maurice Ramsden, Sris Chandra Ray, Brian Fitzgerald Russell, John Howard Simmons, John Gordon Thomson, Gilbert Reynolds Troup, George Jasper Wherrett, and John Wolstencroft.

Licences to practise were conferred upon 142 candidates (125 men and 17 women) who have passed the Final Examination of the Conjoint Board and have complied with the by-laws of the College. The following are the names and medical schools of the successful candidates:—

W. Addey, Manchester; S. Ahmad, Punjab and London; H. F. Apthorpe Webb, Cambridge and St. Bart.'s; P. B. Ascroft, Middlesex; F. I. Ashton, St. Thomas's; J. C. Banerjea, Calcutta and Guy's; A. Barber, St. Bart.'s; F. R. Beetham, Leeds; J. E. L. Bendor-Samuel, London; K. C. Bhattacharyya, Calcutta and St. Thomas's; J. G. Bowen, London; B. R. Bramwell, Manchester; W. J. Burgess, St. Bart.'s; A. C. Byles, St. Mary's; W. H. P. Cant, Birmingham; A. Caplan and C. L. Carter, St. Bart.'s; Rosa E. Chamings, Royal Free; F. W. Chippindale, Guy's; D. O. Clark, St. Thomas's; B. S. Cornell, Toronto; D. W. C. Cox, Cardiff and Guy's; H. J. Croot, Guy's; J. E. Curnock, Charing Cross; R. E. S. Dalliwall, Cambridge and St. Bart.'s; H. L. G. Davies, Cardiff and St. Bart.'s; E. Dikshitulu, Madras and Charing Cross; Claire de M. Dorey, Royal Free and St. Mary's; A. N. Duggal, Punjab and Guy's; C. M. Duncan, Oxford and St. Bart.'s; F. B. P. Evans, Birmingham; H. R. Ferguson, Cambridge and St. George's; Doreen P. Firmin, Cambridge and Westminster; R. H. Franklin, St. Thomas's; J. F. Galpine, Leeds; A. J. Gibbs, Oxford and St. Thomas's; E. J. Goldsmith, St. Thomas's; Rebecca Goldstein, Univ. Coll.; R. T. S. Goodchild, London; D. R. Goodfellow, Cambridge and Manchester; R. K. Goyal, Punjab and London; Charlotte Gray, Univ. Coll.; A. H. Gurney, Cambridge and St. Bart.'s; B. Halfpenny, Middlesex; R. S. Harrison, Oxford and Guy's; J. E. M. Harrison, Cambridge and London; W. Heard, Middlesex; Aureval Heaton, Royal Free; Katherine M. Heberlet, Univ. Coll.; L. Hershfield, Manitoba and Middlesex; P. Y. Hicks, St. Thomas's, R. S. Hodge, Univ. Coll., H. B. Hough, Toronto and Charing Cross; Eugenie C. Illingworth, Leeds; H. B. Jackson, Middlesex; W. D. G. James, Cardiff and St. Mary's; J. L. Jekyll, Cambridge and London; E. K. Jones, London; G. L. Jones, St. Thomas's; H. J. Knight, St. Mary's; E. O. Lakey, Univ. Coll.; G. F. Langley, Bristol; L. J. Lannaman, St. Bart.'s; R. O. Lee, Cambridge and St. Thomas's; A. Lister, Cambridge and London; E. L. Littler, King's Coll.; W. E. B. Lloyd, Cambridge and St. Bart.'s; V. J. Lopez, St. Mary's; P. A. T. Lowden, St. Thomas's; F. D. MacCarthy, Cambridge and St. George's; Laura H. Macfarlane, Royal Free; H. A. McGregor, Cardiff and St. Bart.'s; G. K. McKee, St. Bart.'s; K. M. Macleod, Cornell, Edinburgh, and Middlesex; J. S. MacVine, St. Bart.'s; E. Marks, Bengal and St. Mary's; I. W. Matheson, St. Bart.'s; F. C. Mayo, Cambridge and King's Coll.; B. R. Medlycott, Guy's; S. J. Mehta, Bombay and St. Bart.'s; P. D. Mottet, Univ. Coll.; G. Na Ranong, St. Thomas's; L. B. Neel, Cambridge and St. George's; A. H. Nelson, Charing Cross; H. P. Nelson, Durham; J. E. Newton, Bristol; A. P. M. Page, St. Bart.'s; H. N. Palmer, King's Coll.; R. A. H. Pearce, Middlesex; A. Phillips, London; W. Phillips, Cardiff and Univ. Coll.; L. D. Pringle, Guy's; Ruth Pumphrey,

Univ. Coll.; Alison J. Rae, Royal Free; D. S. Raju, Madras and Guy's; H. Ramsay, Middlesex; P. V. Reading, Guy's; J. G. Reid, Oxford and St. George's; B. C. Rennie, Otago; Colleen Rice, Charing Cross; J. F. Riches, St. Thomas's; E. H. Rink, Oxford and Guy's; S. L. Robert, Bombay and Birmingham; B. P. Robinson, Manchester; Alice I. Roughton, Cambridge; H. K. Said, Cairo and Charing Cross; J. F. Sandow, Middlesex; N. D. Sane, Bombay and London; S. Segalov, St. Bart.'s; R. L. Sethi and D. P. Settna, Bombay and London; G. C. Sheldon, King's Coll.; Helana Sidarous, Royal Free; H. Silverstein, St. Bart.'s; Margaret Skelton, Univ. Coll.; L. A. H. Snowball, King's Coll.; R. G. Sowter, Guy's; H. H. L. Spitz, Leipzig and Middlesex; B. T. Squires, Oxford and Guy's; R. Stanley, Birmingham and St. Thomas's; A. E. Stevens, London; E. N. Stevens, Guy's; N. Stevens, Cambridge and St. Thomas's; F. H. Stevenson, Guy's; Ada M. W. Stewart, Liverpool and Univ. Coll.; T. S. Stone, London; S. Le R. Switzer, Cambridge and London; P. H. Taylor, King's Coll.; D. M. Thomas, Middlesex and Cardiff; V. Thorne Thorne, Cambridge and St. Bart.'s; D. P. Turner, King's Coll.; S. C. Wake, Bristol; Doris E. C. Walker, Univ. Coll.; E. M. Ward, St. Bart.'s; J. N. Warren, Cambridge and London; A. J. Whitaker, Univ. Coll.; A. J. White, Middlesex; G. W. Whittall, Cambridge and St. Thomas's; R. C. Williams, St. Thomas's; E. R. Willis, London; H. M. Yardley, Cambridge and St. Thomas's; and B. Yuill, Toronto and London.

The undermentioned diplomas were conferred jointly with the Royal College of Surgeons upon the following candidates:—

DIPLOMA IN PUBLIC HEALTH.

D. D. Anderson, S. Atta Ullah, B. N. V. Bailey, M. K. Biswas, Gwenddolen J. Brooke, Izza Caley, H. D. Chalke, Victoria M. Crosse, Jane G. E-F. Cummins, N. C. Dasgupta, A. N. Duggal, J. B. Ellison, R. F. Fidler, S. J. Firth, Annie M. Gamble, T. S. Gill, S. A. Haque, L. W. Hearn, G. H. Hogben, J. D. Hourihane, D. F. Johnstone, M. L. Kalra, Y. M. Khan, R. A. V. Lewys-Lloyd, E. A. Lumley, R. M. Macfarlane, M. Mitman, S. K. Mitra, P. McG. Moffatt, C. G. M. Nicol, P. Pattabhiramaiya, J. R. Pierre, S. L. Rikhye, Dora F. M. Rose, A. C. Sinclair, E. R. Smithard, R. C. Suri, H. W. Tilling, P. M. Wagle, and Ethel M. Weir.

DIPLOMA IN LARYNGOLOGY AND OTOLOGY.

W. M. Brown, S. Debono, D. N. Ghosh, G. B. Girgis, S. K. Jatar, V. Kathirgamatamby, J. G. Kingsbury, F. E. Littlewood, M. MacGregor, N. M. Macindoe, H. G. Mitchell, J. H. Otty, M. D. Patel, D. R. Paterson, P. Pattabhiramaiya, T. Prasad, D. H. Rao, and S. L. Vella.

DIPLOMA IN PSYCHOLOGICAL MEDICINE.

D. I. Cameron, J. Carse, H. A. Cooper, R. T. Hay, J. F. MacMahon, J. D. W. Pearce, Margaret A. Quine, A. Shepherd, J. G. T. Thomas, G. S. Wilson, and H. L. Wilson.

UNIVERSITY OF LONDON.—At a meeting of the Senate on Jan. 29th the degree of D.Sc. in Zoology was awarded to Mr. E. A. Spaul for a thesis on the Activity of the Anterior Lobe Pituitary.

Dr. H. A. Harris, assistant professor of anatomy at University College, and assistant to the medical unit at University College Hospital, was awarded the William Julius Mickle Fellowship for 1930 in respect of research on problems of growth in man and animals. This Fellowship is given annually to the graduate of the University who is held to have done most to advance medical art or science in the preceding five years.

Mr. H. L. Eason was reappointed representative of the University on the General Medical Council.

A Diploma in Public Health for External Students was established.

University College.—A course of six public lectures on Antiseptics will be given by Mr. H. R. Ing, D.Phil., on Mondays and Thursdays at 5.15 P.M., beginning on Feb. 13th.

ASSOCIATION OF CLINICAL PATHOLOGISTS.—The third annual meeting of the British Pathologists' Association was held in the Pathological Department, University College Hospital Medical School, on Jan. 25th. The morning session was devoted to the consideration of the Technique and Interpretation of the Fractional Test Meal. Communications were made by Dr. E. Christine Emma Pillman-Williams, who described the technique of the withdrawal and analysis of the meal, and by Dr. G. W. Goodhart, who dealt at length with the interpretation of results. Dr. Goodhart laid special stress upon the importance of the determination of the chlorides, and expressed the opinion that the findings could best be accounted for on the assumption of regurgitation of alkaline duodenal contents. Both papers were followed by lively discussion. During the afternoon session demonstrations were given as follows: by Dr. H. D. Wright, medium for growing pneumococci; hæmolytic power of streptococci. Dr. G. W. Goodhart, diphtheria of the vulva; pernicious anæmia without achlorhydria. Dr. D. Embleton, blood from recovered case of agranulocytic agina. Dr. G. W. Barnard, hearts injected to show the coronary circulation; hearts showing coronary thrombosis. Prof. Hadfield, specimens from case of Lindau's disease, and other pathological specimens. At the general meeting it was decided to change the name of the association to the Association of Clinical Pathologists.

SOCIETY OF MEDICAL OFFICERS OF HEALTH.—A provincial meeting of the maternity and child welfare group will be held at Bristol from Feb. 20th to 22nd. The hon. secretary's address is 1, Holly-terrace, Highgate, London, N. 6.

MEDICAL OFFICERS OF SCHOOLS ASSOCIATION.—The annual general meeting of this association will be held at 11, Chandos-street, Cavendish-square, London, W., on Friday, Feb. 21st, at 5 P.M., when Dr. G. E. Friend will deliver a presidential address, entitled Some Notes on the Value of Clinical, Dietetic, and Physical Records in Public Schools.

POST-GRADUATE COURSE IN ORTHOPÆDIC SURGERY.—A special fortnight's course will be held at the Royal National Orthopædic Hospital, Great Portland-street, London, W. 1, from March 10th to 22nd. Those taking the course will have access to operations and the practice of the hospital. Application should be made to the secretary of the hospital, or to the secretary of the Fellowship of Medicine, at 1, Wimpole-street, W.1.

LONDON JEWISH HOSPITAL MEDICAL SOCIETY.—A dinner in honour of Dr. Heinrich Neumann, professor of otology in the University of Vienna, will be given by this society at the First Avenue Hotel, High Holborn, London, on Sunday, Feb. 9th, at 7.15 for 8 P.M. Application should be made to Mr. M. Sourasky at 59, Queen Anne-street, W.1.

INTERNATIONAL SOCIETY FOR MICROBIOLOGY.—The first international Congress organised by this society will be held in Paris from July 20th to 25th. Those who desire to take part, whether members of the society or not, should send a subscription of 100 French francs to the Treasurer of the Congress, M. Georges Masson, 120, Boulevard Saint-Germain, Paris (VI^e^). Notification for enrolment will be received up to June 15th.

QUEEN CHARLOTTE'S MATERNITY HOSPITAL.—The committee of management has decided to appoint a pædiatrician to the staff of this hospital, and Dr. Eric Pritchard has, at their invitation, accepted this office. It is understood that this appointment will not conflict with Dr. Pritchard's work as Medical Director of the Infants Hospital. Dr. J. Hartley Gibbens has been appointed assistant to Dr. Pritchard at Queen Charlotte's.

ANIMAL DISEASES RESEARCH INSTITUTE.—Mr. John Russell Greig, Ph.D., professor of medicine and materia medica in the Royal (Dick) Veterinary College, Edinburgh, has been appointed Director of the Institute at Moredun in succession to Mr. W. A. Pool, who is now Deputy Director of the Imperial Bureau of Animal Health at Weybridge.

NEW NURSES' HOMES.—The new nurses' home at Crumpsall Infirmary, Manchester, was formally opened last week by Mr. Hugh Fay, Chairman of the Manchester Board of Guardians. The building, which has cost £80,000, will accommodate 220 nurses.—A home for the nurses of Forfar Infirmary, built with an allocation from the estate of the late Sir James Duncan, was also opened last week.

SUN-BATHING IN MANCHESTER.—The Manchester Parks Committee have decided that Platt Fields should be the first park in which sun-bathing may be combined with open-air bathing. The necessary alterations will be made so that sun-bathing may be begun at the end of May (weather permitting). People will be able to go to Platt Fields and take sun-baths on the sand in bathing costumes.

REDLANDS HOSPITAL FOR WOMEN.—This Glasgow hospital has just been enlarged by the incorporation of an adjoining house which will accommodate 22 maternity cases. The object of the maternity extension is to provide efficient treatment for expectant mothers able to pay a fee ranging from 3½ to 6 guineas a week.

ADDENBROOKE'S APPEAL.—Last week Sir Humphry Rolleston broadcast an appeal from 5XX for the building fund of Addenbrooke's Hospital, Cambridge. He stated that of the £90,000 required only about one-third had yet been raised.

LERWICK HOSPITAL.—It is hoped to raise £10,000 to enlarge and a further £10,000 to endow the Lerwick Hospital which serves the Shetland Islands. Last year there were 339 in-patients and 882 out-patients, the operations numbered 484, and the percentage of deaths was 4·39.

DUNFERMLINE AND WEST FIFE HOSPITAL.—The Managers report that the cost per occupied bed had increased last year from £98 9*s.* 4*d.* to £103 17*s.* 6*d.*; there was a surplus on the year's working of £2628. An important extension, for which over £51,000 has been raised, will be ready for occupation at the beginning of next month.

LONDON CLINIC FOR RHEUMATISM.—On Feb. 25th the Queen will open the new clinic for the treatment of rheumatism which is being established by the British Red Cross Society in Regent's Park, London. It is stated that the clinic will be capable of dealing with 400 cases a day. It will provide treatment: (1) for workers insured under the National Health Insurance Acts, and (2) for men and women able and willing to pay a reasonable fee. There will be a resident medical officer and a visiting staff of physicians and surgeons.

DINNER TO NOBEL LAUREATES.—Sir Charles Martin presided at a dinner given in London by the Biochemical Society on Feb. 3rd in honour of the Nobel Laureates in Chemistry and Medicine for the past year. Sir Frederick Hopkins, Prof. Hans von Euler, and Prof. Arthur Harden responded briefly to the toast proposed by the chairman, and seconded by Prof. G. Barger. The fourth Laureate, Prof. C. Eijkman, was unable to be present owing to ill-health. The Swedish Minister and the President of the Royal Society responded to the toast of the Guests, proposed by Sir William Hardy.

ROYAL MEDICAL BENEVOLENT FUND.—At meetings of the Committee in December and January a total of £2379 was voted in 113 cases in which help was required by medical men or by their widows or families. The following are particulars of five of these cases:—

Widow, aged 50, of L.R.C.P.&.S. whose husband died suddenly in September, 1929, at the age of 51 from heart failure. The widow who is in very delicate health was left an income of £50 p.a. and children dependent on her. Voted Grant of £36 and a special gift of £14.

M.D., aged 60, married, suffering from tuberculosis and in a Sanatorium. Practice has been sold and when proceeds are invested will give an income of £135. Applicant has one son and two daughters. Two eldest have secured posts. Voted £40.

Widow, aged 60, of M.R.C.S. Her husband suffered from ill-health all his life and was never able to work enough to save any money. At his death in November the widow and one daughter were left with a capital of £200. The daughter has been trained and will obtain employment. Voted £26 and special gift of £10.

Two daughters, aged 61 and 58, of L.F.P.S. Only income is £17 each, gifts from friends and deposit interest on the sum of £57. Voted £36 each.

Daughter, aged 70, of M.R.C.S. Has been in bed during the whole of the last 12 months. Income from charities £30; old age Pension £26. Voted £30.

The Committee appeals urgently for subscriptions, donations, and legacies. Cheques should be sent to the hon. treasurer of the Fund at 11, Chandos-street, W.1.

Medical Diary.

SOCIETIES.

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

MONDAY, Feb. 10th.—5 P.M., UNITED SERVICES (late War Section). Paper: Wing.-Comdr. H. A. Treadgold: Cardiac Functional Efficiency in the Young Male Adult.

TUESDAY.—5 P.M., THERAPEUTICS AND PHARMACOLOGY. An informal Discussion on the Treatment of Uræmia. Opener: Prof. F. Langmead. Members of the Sections of UROLOGY, MEDICINE, and DISEASE IN CHILDREN are specially invited to attend and take part in the Discussion. 8.30 P.M., PSYCHIATRY and NEUROLOGY. Discussion on the Diagnosis and Treatment of the Milder Forms of the Manic-depressive Psychosis. Openers: Sir Farquhar Buzzard, Dr. George Riddoch, Dr. W. R. Reynell, and Dr. Neill Hobhouse (Neurology), Dr. Crichton Miller, Dr. Maurice Wright, and Dr. Helen Boyle (Psychiatry).

WEDNESDAY.—5.30 P.M., SURGERY: SUBSECTION OF PROCTOLOGY. Discussion on Factors Making for Safety in the Surgery of the Colon and Rectum. Opener: Mr. G. Gordon-Taylor. Followed by Sir Charles Gordon-Watson, Mr. Ivor Back, Mr. Lionel Norbury, Mr. W. B. Gabriel, Mr. Lawrence Abel, and others.

THURSDAY.—8.30 P.M., NEUROLOGY. Short Papers: Dr. S. A. K. Wilson: The Relation of Nervous Symptoms to Nervous Lesions. Dr. E. Arnold Carmichael and Mr. J. Paterson Ross: Radium and Nervous Tissue; an Experimental Study.

FRIDAY.—5.30 P.M., CLINICAL. (Cases at 4.30 P.M.). Cases: Mr. Philip Turner: 1. A Case of Von Recklinghausen's Disease. Mr. Cecil P. G. Wakeley: 2. Case of Fracture of Cervical Spine. 3. Case of Dislocation of the Carpal Semilunar. 4. Köhler's Disease with "Mulberry" Femoral Epiphyses. 5. Tuberculous Ulcer of Tongue. Dr. Bernard Myers: 6, 7 and 8. Three Cases of Purpura. 9. Case of Spina Bifida. Mr. Paul Bernard Roth: 10. Unusual Case of Loose Body in Each Knee-joint of Traumatic Origin. Dr. F. Parkes Weber and Dr. O. B. Bode: 11. Facial Lipodystrophia with Unerupted Upper Central Incisor Teeth. 12. Alopecia Totalis after Slight Nervous Shock. Mr. Harold Edwards: 13. Case of Cutaneous Growth of Keloid Nature (for Diagnosis). 14. Cyst of the Neck of the Femur in a Child. Mr. R. Rutherford: 15. Case of Schlatter's Disease. 16 and 17. Two Cases of Multiple Exostoses in a Family. Dr. Harold Avery: 18. A Case of the Jaw-winking Reflex. 19. Case of Rumination in Man. 20. Advanced Osteo-arthropathy in a Case of Pulmonary Neoplasm. Mr. A. E. Mortimer-Woolf: 21. Case of Osteitis Deformans with Sarcoma. Dr. Terence East: 22. Case of Splenic Enlargement of Obscure Origin. 8 P.M., OPHTHALMOLOGY. Papers: Mr. Foster Moore: Unusual Coloration of Sclerotics. Mr. Ransom Pickard: The Red Field and Optic Disc Resistance in Glaucoma and Allied Conditions. Cases: Mr. J. H. Doggart: A Case of Distichiasis. Mr. A. F. MacCallan: Binocular Detachment of Retina in a Boy Aged 8. Other Cases will be shown.

BIOCHEMICAL SOCIETY.

MONDAY, Feb. 10th.—3.30 P.M. (at the Lister Institute, Chelsea Bridge-road, S.W.). Demonstrations. Papers at 5 P.M.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn-fields, W.C.

FRIDAY, Feb. 14th.—4 P.M., Prof. E. W. Hey Groves: Hero Worship in Surgery. (Hunterian Oration.)

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.

MONDAY, Feb. 10th, to SATURDAY, Feb. 15th.—MEDICAL SOCIETY (Lecture Room), 11, Chandos-street, Cavendish-square, W. Tues., at 4 P.M., Lecture by Dr. M. B. Ray on the Rôle of Hydrology in Medical Practice. No fee.—CANCER HOSPITAL, Fulham-road, S.W. Thurs., at 2.15 P.M., Demonstration by Mr. Cecil Rowntree. No fee.—PADDINGTON GREEN CHILDREN'S HOSPITAL, Paddington Green, W. Fri., at 4 P.M., Lecture-demonstration by Dr. D. W. Winnicott on Anxiety in Children. No fee.—CHELSEA HOSPITAL FOR WOMEN, Arthur-street, S.W. Special course in Gynæcology, lectures and demonstrations in the operating theatre.—HOSPITAL FOR TROPICAL DISEASES, 25, Gordon-street, W.C. Post-graduate course in Tropical Medicine. Tues. and Thurs. afternoons at 2 P.M.—BETHLEM ROYAL HOSPITAL, St. George's Fields, S.E. Course in Psychological Medicine. Lecture-demonstrations on Tues. and Sats. at 11 A.M. Further particulars from the Fellowship of Medicine.

WEST LONDON HOSPITAL POST-GRADUATE COLLEGE, Hammersmith, W.

MONDAY, Feb. 10th.—10 A.M., Dr. Dowling: Skin Department. 11 A.M., Mr. Tyrrell Gray: Surgical Wards. 2 P.M., Mr. Sinclair: Surgical Wards.

TUESDAY.—10 A.M., Medical Registrar: Medical Wards. 2 P.M., Mr. Hamblen Thomas: Throat, Nose, and Ear Dept. 2.30 P.M., Sir Henry Simson: Gynæcological Operations.

WEDNESDAY.—10 A.M., Dr. Burnford: Medical Wards. 2.30 P.M., Mr. Donald Armour: Surgical Wards. Dr. Scott Pinchin: Medical Out-patients.

THURSDAY.—11.30 A.M., Mr. Simmonds: Demonstration of Fractures. 2 P.M., Mr. Bishop Harman: Eye Department. 2 P.M., Mr. MacDonald: Genito-Urinary Department.

FRIDAY.—10 A.M., Dr. Pritchard: Medical Wards. 2 P.M., Mr. Vlasto: Throat, Nose, and Ear Department. 2 P.M., Mr. Sinclair: Operations.

SATURDAY.—9 A.M., Mr. Vlasto: Throat, Nose, and Ear Operations. 9.30 A.M., Dr. Burnford: Bacterial Therapy Department. 10 A.M., Dr. Owen: Medical Children's Department.

Daily, 10 A.M. to 5 P.M., Medical, Surgical and Special Out-patients, Operations, Ward Visits, Anæsthetic Courses.

NORTH-EAST LONDON POST-GRADUATE COLLEGE, Prince of Wales's General Hospital, Tottenham, N.

MONDAY, Feb. 10th.—2.30 to 5 P.M.: Medical, Surgical, and Gynæcological Clinics. Operations.

TUESDAY.—2.30 to 5 P.M.: Medical, Surgical, Ear, Nose, and Throat Clinics. Operations.

WEDNESDAY.—2.30 to 5 P.M.: Medical, Skin, and Eye Clinics. Operations.

THURSDAY.—11.30 A.M.: Dental Clinics. 2.30 to 5 P.M.: Medical, Surgical, Nose, Throat and Ear Clinics. Operations.

FRIDAY.—10.30 A.M.: Throat, Nose and Ear Clinics. 2.30 to 5 P.M.: Surgical, Medical, and Children's Diseases. Clinics. Operations.

CHADWICK PUBLIC LECTURE.

THURSDAY, Feb. 13th.—5.15 P.M. (in the Lecture Hall of the Medical Society of London, 11, Chandos-street, Cavendish-square, W.), Prof. B. Blacklock: Health in West Africa.

UNIVERSITY COLLEGE, Gower-street, W.C.

MONDAY, Feb. 10th.—5 P.M., Prof. A. V. Hill: Oxygen and the Recovery Process in Muscle and Nerve.

ROYAL NORTHERN HOSPITAL, Holloway.

TUESDAY, Feb. 11th.—3.15 P.M., Dr. C. C. Beatty: Demonstration of Cases.

CENTRAL LONDON THROAT, NOSE, AND EAR HOSPITAL, Gray's Inn-road, W.C.

MONDAY, Feb. 10th.—1.30 P.M., Hearing Tests.

WEDNESDAY.—1.30 P.M., The Sinuses: Examination and Diagnosis.

FRIDAY.—4 P.M., Mr. J. D. McLaggan: Some Complications of Nasal Sepsis.

SOUTH-WEST LONDON POST-GRADUATE ASSOCIATION.

WEDNESDAY, Feb. 12th.—4 P.M., Dr. J. Browning Alexander: The Investigation of Dyspeptic Conditions.

KING'S COLLEGE HOSPITAL MEDICAL SCHOOL, Denmark Hill, S.E.
THURSDAY, Feb. 13th.—9 P.M., Dr. R. D. Lawrence: The Clinical Value of Chemical Investigations.

LONDON SCHOOL OF DERMATOLOGY, St. John's Hospital, 49, Leicester-square, W.C.
TUESDAY, Feb. 11th.—5 P.M., Dr. E. Graham Little: Ulcus Molle.
THURSDAY.—5 P.M., Dr. J. E. M. Wigley: Lupus Erythematosus.

ST. MARY'S HOSPITALS, Manchester.
FRIDAY, Feb. 14th.—4.30 P.M. (at the Whitworth-street West Branch), Post-graduate Lecture, Dr. J. F. Ward: Vomiting in Infancy and Early Childhood.

SHEFFIELD POST-GRADUATE CLINICS.
TUESDAY, Feb. 11th.—3.30 P.M. (at the Jessop Hospital), Mr. King: Practical Antenatal Care and Its Limitations.
FRIDAY.—3.30 P.M. (at the Royal Infirmary), Mr. W. J. Lytle: Stone in the Urinary Tract.

GLASGOW POST-GRADUATE MEDICAL ASSOCIATION.
WEDNESDAY, Feb. 12th.—4.15 P.M. (at the Ear, Nose, and Throat Hospital), Cases by the Staff.

Appointments.

EDEN, G., M.D., B.Ch. Camb., has been appointed Hon. Physician to the Queen's Hospital, Birmingham.
LAWRIE, J. H. D., M.D. Edin., D.P.H., Medical Officer of Health for Macclesfield.
LILICO, G., M.B., Ch.B. Edin., D.P.H. Medical Officer of Health for Derby.

Vacancies.

For further information refer to the advertisement columns.

Abergele Sanatorium, North Wales.—Temporary Med. Supt. 15 gns. a week.
Barrow-in-Furness, North Lonsdale Hospital.—H.S. £150.
Bedford County Hospital.—H.S. At rate of £175.
Birmingham City and University, Joint Board of Research for Mental Disease.—Histological Asst. £4 weekly.
Birmingham General Hospital.—Res. Surg. Reg. £120–£140.
Bradford, Royal Eye and Ear Hospital.—Jun. H.S. £150.
Bristol Eye Hospital.—H.S. £150.
British Red Cross Society, Clinic for Rheumatism, Regent's Park.—Clin. Pathologist (part-time). £250.
Burnley, Victoria Hospital.—H.P. At rate of £125.
Buxton, Devonshire Hospital.—Asst. H.P. At rate of £150.
Carlisle, Cumberland Infirmary.—H.P. Also H.S. to Special Depts. Each at rate of £155.
Carlisle, Cumberland and Westmorland Mental Hospital.—Deputy Med. Supt. £500.
Chelsea Health Soc. and School for Mothers.—M.O.
Chester Royal Infirmary.—H.S. £150.
Coventry and Warwickshire Hospital.—Hon. Asst. Dental Surg.
Croydon County Borough.—Asst. M.O., &c. £600.
Derby, Brethy Hall Orthopædic Hospital.—Asst. M.O. At rate of £150.
Derby, Derbyshire Educa'ion Committee.—Asst. School M.O. £600.
Derby, Derbyshire Royal Infirmary.—Ophth. H.S. H.S. Also Asst. H.S. Each £150.
Doncaster, Royal Infirmary.—Third H.S. At rate of £150.
Durham C.C.—Deputy County M.O.H. £1000.
Ealing, Borough of.—Asst. M.O.H. £600.
East Ham Memorial Hospital, Shrewsbury-road, E.—Hon. Asst. Ophth. S.
Gloucester County and City Mental Hospitals.—Med. Supt. £1100.
Golden Square Throat, Nose and Ear Hospital, W.—H.S. £100.
Great Yarmouth General Hospital.—Sen. H.S. £150.
Hackney Union Hospital, High-street, Homerton, E.—Dental S. £100.
Hornsey Borough.—Asst. M.O.H. and Asst. School M.O. £600.
Hull Royal Infirmary.—Cas. H.S. At rate of £130.
Infants Hospital, Vincent-square, Westminster, S.W.—Clin. Asst. for Out-Patient Dept.
Ipswich, East Suffolk and Ipswich Hospital.—Cas. O. £150.
King's Lynn, West Norfolk and King's Lynn Hospital.—Hon. Physician.
Leeds, Tuberculosis Sanatorium, Killingbeck.—Asst. Res. M.O. £250.
Liverpool, Royal Liverpool Children's Hospital, Myrtle-street.—Res. Cas. O. £250.
Liverpool, Royal Children's Hospital.—Two Res. H.P.'s and two Res. H.S.'s. Each at rate of £60. Also Res. M.O. at Heswall Branch. At rate of £120.
London Jewish Hospital, Stepney Green, E.—Cas. O. At rate of £150.
Macclesfield General Infirmary.—Second H.S. At rate of £150.
Maidstone, Kent County Ophthalmic and Aural Hospital.—H.S. to Ear, Nose and Throat Dept. At rate of £200.
Maidstone, West Kent General Hospital.—H.S. At rate of £220.
Manchester, Ancoats Hospital.—Orthopædic H.S. Also H.P. Each at rate of £100.
Manchester Royal Infirmary.—Three Clin. Assts. Each £35 for six months.
Manchester, Victoria Memorial Jewish Hospital, Cheetham.—Anæsthetist. One gn. per session.
Manchester and Salford Hospital for Skin Diseases.—H.S. £100.
Margate, Royal Sea Bathing Hospital for Surgical Tuberculosis.—Radiologist. 100 guineas.
Miller General Hospital, Greenwich, S.E.—Res. M.O., Cas. O. and H.P. At rate of £250, £150, and £125 respectively.
Newcastle-on-Tyne, Wooley Sanatorium, near Hexham.—Asst. M.O. £350.
Norwich, Norfolk and Norwich Hospital.—H.S. £120.
Nottingham Hospital for Women.—H.S. At rate of £150.
Oswestry, Shropshire Orthopædic Hospital, and Agnes Hunt Hospital.—H.S. At rate of £200.
Plymouth, South Devon and East Cornwall Hospital.—Hon. Asst. S. to Obstet., &c. Dept.
Royal Northern Hospital, Holloway.—H.S. Also Res. Outpatient Cas. O. and Anæsthetist. Each at rate of £70.
Royal Waterloo Hospital for Children and Women, Waterloo-road, S.E.—H.P. At rate of £100.
St. Bartholomew's Hospital, E.C.—Dental H.S. £80. Also three Asst. Dental S's.
St. John's Hospital, St. John's Hill, Wandsworth, S.W.—Second Asst. Res. M.O. £400.
St. Mark's Hospital for Cancer, Fistula, &c., City-road, E.C.—H.S. At rate of £75.
Salford Royal Hospital.—H.S. to Orthopædic Dept. At rate of £125.
Sheffield Royal Hospital.—Ophth. H.S. Also Res. Anæsthetist. Each at rate of £80.
Sheffield Royal Infirmary.—Asst. Cas. O. At rate of £80.
Southport General Infirmary.—Sen. H.S. £200.
Stirling District Mental Hospital, Larbert.—Jun. Asst. M.O. £300.
Taunton and Somerset Hospital.—Hon. Visiting S. or Two Asst. Hon. Visiting S.'s
Truro, Royal Cornwall Infirmary.—H.S. £170.
Walsall County Borough.—Asst. M.O. £600.
West London Hospital, Hammersmith-road, W.—H.P., Two H.S.'s and Res. Anæsthetist. Each at rate of £100.
Westminster Hospital, Broad Sanctuary, S.W.—Orthopædic Surgeon.
Willesden U.D.C.—Asst. M.O. £600.
Windsor, King Edward VII. Hospital.—H.S. At rate of £ 00.

The Chief Inspector of Factories announces vacant appointments for Certifying Factory Surgeons at Dunoon (Argyle), and Sandbach (Ches.).

Applications from Ophthalmic Specialists are invited for the post of Medical Referee under the Workmen's Compensation Act to deal with cases arising in the districts of the following County Courts:—Dewsbury, Leeds, Otley, and Wakefield (Circuit No. 14), Pontefract, Tadcaster, and York (Circuit No. 15). Applications should reach the Private Secretary, Home Office, Whitehall, London, S.W., not later than March 3rd.

Births, Marriages, and Deaths.

BIRTHS.

MCCAY.—On Jan. 27th, at Headington, Oxford, the wife of Dr. C. A. R. McCay, of a daughter.
VINER.—On Jan. 29th, at Chorley Wood, Herts, to Mona (née de la Mare), the wife of Geoffrey Viner, M.D., F.R.C.S., of 4, Harley-street, W.1—a daughter.

MARRIAGES.

ALLOTT—KYDD.—On Jan. 29th, at St. Paul's Presbyterian Church, Birkenhead, Eric Newmarch Allott, B.M., M.R.C.P., to Edith Mary, younger daughter of Mrs. Kydd and the late William Kydd, of Birkenhead.
BATES—PYKE.—On Feb. 1st, at St. Mary Abbot's, Kensington, Ralph Bates, F.R.C.S. Eng., to Evelyn Pyke, M.R.C.S., L.R.C.P., younger daughter of the late Lionel Pyke, Q.C., and Mrs. Pyke.
PUGH—CULLWICK.—On Jan. 29th, at St. Peter's Church, Wolverhampton, Mervyn Phippen Pugh, D.S.O., M.C., to Vera Cullwick, M.B., Ch.B., youngest daughter of Mr. and Mrs. H. E. Cullwick, of Wolverhampton.
ROFF—DYSON.—On Jan. 28th, at St. James', Birch, by the Right Rev. the Lord Bishop of Middleton, Chas. D. Roff, son of Mr. and Mrs. C. D. A. Roff, of London, to Margaret Dyson, daughter of Dr. and Mrs. W. Dyson, of Rusholme. At home, Feb. 27th and 28th, Beechfield, Wilmslow.

DEATHS.

BURY.—On Feb. 3rd, 1930, at Hollinwood, Darwen, G. W. Bury, M.D. Vict., F.R.C.S. Edin., aged 44.
CLAPP.—On Jan. 27th, at his residence, Downside, Whitchurch, Tavistock, Devon, Robert Clapp, Physician and Surgeon, M.R.C.S. Eng., L.R.C.P. Lond.
DAVIS.—On Feb. 3rd, at Bournemouth, Charles Daniel Davis, M.R.C.S., L.D.S. Eng., of Merstham, Surrey, and late of Streatham Hill.
DRABBLE.—On Jan. 31st, at The Grange, Walton-on-Thames, George White Drabble, M.A., M.B., B.C., in his 66th year.
ELLIS.—On Jan. 29th, at a nursing home in London, of peritonitis, William McDonogh Ellis, M.D., M.R.C.S., L.R.C.P., of "Greenbanks," Woldingham, Surrey, and late of Bath, Somerset.
KEKWICK.—On Jan. 27th, at "Ellerslea," Dalston, Cumberland, John Kekwick, M.R.C.S., L.R.C.P., L.D.S.
MACARTNEY.—On Jan. 27th, at Brighton, of heart failure, James Macartney, M.D., Lieut.-Colonel, late R.A.M.C.
SCOTT.—On Jan. 28th, at Saskatoon, James Matthews Duncan Scott, M.D.Edin., D.P.H. Camb., Professor of Physiology in the University of Saskatchewan, Saskatoon.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

Notes, Comments, and Abstracts.

THE ANTI-NOISE CAMPAIGN IN NEW YORK.

EVERY civilised community is finding itself faced with the problem of noise and the devastating effect of continual and excessive auditory stimuli on the nerves of the people. New York has tried to reduce the problem to mathematical terms by inventing a unit of sound—the "bel." Broadcasting a description of the work on Dec. 31st, Dr. Harvey Fletcher produced the sound of a motor horn ten feet away as an example of "nine bels" of sound. The noise in various parts of New York is being measured by producing a clear warbling note that can just be heard above the traffic roar and then measuring the intensity of the note in a "noise meter." This is a sensitive microphone which converts the sound waves into electric currents, which in turn are amplified and passed into an electric meter. The quality, as well as the quantity, of city noises is being tested by means of noise filters. The investigators are finding out the part played by specific sources—e.g., trucks, trolleys, building operations—in producing the aggregate noise, and also the pitch, range, and loudness of specific noises which are the cause of complaint. When this information has been collected it will be possible to make constructive proposals for noise abatement. Other workers are concerning themselves with the production of sound-proof buildings and of a combined window-ventilator and sound-muffler that will admit air without admitting noise. Mr. R. V. Parsons, an acoustical engineer, in a broadcast talk on Dec. 27th, maintained that sound-proof construction is possible and practicable for offices, homes, and public buildings to-day. While it is the task of architects to introduce improvements in design and construction, much can be done by furnishing the rooms with heavy-pile rugs and hangings and over-stuffed divans and chairs. Books, he observed, are very sound-absorbent. The American economist is convinced that quiet is worth paying for; last year $3,000,000 were spent in quieting American offices. Dr. Donald Laird has found that noise appreciably diminishes the concentration, memory, and speed of employees. Our noise problem may not be as serious as that of New York, but it is certainly bad enough, and it is to be hoped that those who suffer from the effects of modern noise will join with those who are concerned about its effect on the public health and create that public demand which alone will produce the supply of noise-proof devices for our homes and work-rooms.

HEREDITY AND ENVIRONMENT.

IN an address on the relative importance of heredity and environment in the development of the individual, delivered in London under the auspices of the British Social Hygiene Council on Jan. 30th, Mr. C. C. Hentschel remarked that heredity was taken very much for granted. It was expected that like should beget like, and it was not until we considered what a queer world it would be if there were no heredity—with the possibility of a sheep, for instance, giving birth to calves or lizards instead of lambs—that its real meaning became apparent. From the strict biological point of view, the changing of the environment did not seem to be likely to produce any immediate effect upon heritable traits. The question of the inheritance of acquired characters was still one of the vexed controversies of biology, which must be left to the future for solution; and there was little evidence at present to show that the environment could—except perhaps over a long series of generations—produce any marked effect on racial characters. What the environment was able to do was to produce from the organism those characteristics which it had received as its inheritance, and to give them the fullest opportunity for coming to fruition. It was a waste to sow good seed on a barren soil, just as it was a crime to use rich soil for worthless seed. Only if the rich soil was reserved for the good seed could we hope for some permanent racial benefit.

An abstract of Mr. Hentschel's previous lecture on Biology and the Training of Youth appeared on p. 256 of our last issue.

BREADMAKING.

THE aim of a book on breadmaking by Mr. E. B. Bennion[1] is to show that a proper application of the fundamental principles of physics, chemistry, and biochemistry is essential to the practical art of breadmaking. Many chapters of the book are devoted to such problems arising in the bakehouse as the choice and testing of raw materials; the changes involved in fermentation, baking and cooling, and the effect of varying physical and chemical environments on these changes; the advantages and disadvantages of the straight-dough and the sponge-and-dough processes; recipes; the judging qualities and faults in bread; and the diseases which may arise in flour, yeast, and bread. Other chapters deal with the comparative efficiency of different types of fuels, ovens, and machinery used in the bakehouse, and the final chapter is concerned with the dietetic value of bread compared with other foods.

[1] Breadmaking: Its Principles and Practice. By Edmund B. Bennion, M.Sc. Tech. Vict., A.I.C., Head of the National Bakery School, Borough Polytechnic, London. London: Humphrey Milford, Oxford University Press. 1929. Pp. 251. 15s.

WAITING-ROOM LITERATURE.

MUCH admirable volunteer work is being done in the Rhondda Valley in behalf of young boys and youths the victims of unemployment, and an appeal is being made to medical men to come to the assistance of this work in a useful direction. In many medical waiting-rooms there is a large and varied assortment, up to date or otherwise, of illustrated papers and magazines, and it is suggested that the doctors might be willing to send the old issues of this literature as newer ones appear to a collecting centre in the Rhondda for distribution to these lads. The Editor of THE LANCET will be happy to receive the names of those who are willing to coöperate, when an arrangement will be made by which stamped and addressed wrappers for a certain period ahead will be supplied to them. The particular boys for whose sake this suggestion is being made are received regularly in a hut-shelter for instruction and entertainment, and the eagerness has been noticed with which they seek all sorts of general and special instruction. The doings of smart society at home and abroad and at social or sporting functions would have no interest for this audience, but they are hungry for newspapers, magazines, or manuals in which the phenomena of the world and the serious sides of life, its careers and occupations, are recorded. All literature dealing with natural history or providing technical training, as far as the printed word can do this, will be devoured. The gratitude which those who can help in this way will earn can hardly be exaggerated.

"WHERE TO PARK YOUR CAR."

A COMPLETE handbook of parking-places in every part of the United Kingdom and the Irish Free State is issued under this title by the Roadway Time Tables Bookings and Publications, Ltd., Regency House, London, W.1, at 1s. The book has been brought up to date, and in its fourth edition, of nearly 300 pages, gives information about the charge and attendance, if any, the limit of time during which cars may be parked, and the places where automatic traffic signals are in use. The convenience to tourists of knowing in advance where to make for when visiting a strange town is considerable; once the car is safely stowed away a survey can be made of the most acceptable sources of interest or refreshment without fear of infringing local regulations. Travellers from London will be cheered to note in how many provincial towns no time limit is fixed for cars in parking-places. The parking-places within 15 miles of Charing Cross are not very conveniently arranged in the book. It is difficult to see on what basis the districts are classified; the list starts with Westminster and ends with Erith. An index shows the name of the roads in alphabetical order; for example, Adelaide-road, Southall, heads the column, but the other Southall parking-place is indexed under Lady Margaret-road, Southall, and if the reader starts with a wish to find the parking-places in Southall he must either search this index with some care or find Southall (between Kingston and Slough) in Section IV. of the book. The remedy would be to rearrange this section in alphabetical order.

GAS FIRES AND THEIR SETTINGS.

A LITTLE book[1] by the late Sir Lawrence Weaver deals with the artistic or aesthetic rather than with the practical use of gas heating. His efforts will, we hope, influence architects to work out methods of treatment for this efficient heating agency. Cumbersome and ugly chimney-pieces often spoil otherwise pleasant rooms, and are unnecessary when these are heated by gas. Anyone building a new house or rearranging fireplaces will welcome this book; special attention should be paid to Figs. 26, 27, and 28, showing gas fireplaces installed by Sir Giles Scott in his own house. On the more practical side of gas heating we would commend to the ingenuity of gas engineers for solution the problem of the man recently portrayed in *Punch* who desired a lamplighter's long tube in order to light his bedroom gas fire without getting out of bed. This would be a great convenience to invalids.

[1] Gas Fires and their Settings. By Sir Lawrence Weaver, K.B.E., F.S.A. London: The Fanfare Press. 1929. Pp. 64. 7s. 6d.